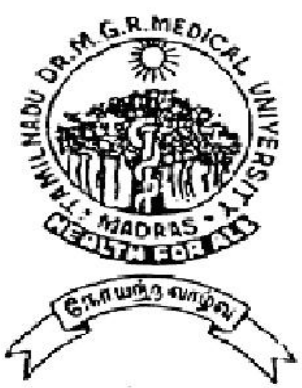
EVALUATION OF EFFICACY OF PREOPERATIVE PARENTERAL TRANEXAMIC ACID IN REDUCING CAESAREAN SECTION BLOOD LOSS

DISSERTATION SUBMITTED FOR

M.D (BRANCH – II)

(OBSTETRICS & GYNAECOLOGY)

MARCH 2010



THE TAMILNADU

DR.M.G.R. MEDICAL UNIVERSITY

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled "**EVALUATION OF EFFICACY OF PREOPERATIVE PARENTERAL TRANEXAMIC ACID IN REDUCING CAESAREAN SECTION BLOOD LOSS"** is a bonafide record work done by **Dr. V. KASTHURI** under my direct supervision and guidance, submitted to the Tamil Nadu Dr. M.G.R. Medical University in partial fulfillment of University regulation for M.D Branch II – Obstetrics & Gynaecology.

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DECLARATION

I **Dr. V. KASTHURI** solemnly declare that the dissertation titled **"EVALUATION OF EFFICACY OF PREOPERATIVE PARENTERAL TRANEXAMIC ACID IN REDUCING CAESEREAN SECTION BLOOD LOSS"** has been prepared by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other University board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the award of M.D degree Branch – II (Obstetrics & Gynecology) to be held in March 2010.

Place : Madurai **Dr. V. KASTHURI**

Date :

ACKNOWLEDGEMENT

My sincere and thankful gratitude to **Prof. Dr. DILSHATH, M.D., D.G.O.,** Professor and Head of the Department of Obstetrics and Gynaecology for her expert guidance and support for the completion of the study.

I am extremely thankful to **THE DEAN**, Madurai Medical College and Government Rajaji Hospital, Madurai for granting me permission to undertake this study.

I am very grateful to **Dr. Parvathavarthini, M.D., D.G.O., Dr. Subbulakshmi, M.D., D.G.O., Dr. Angayarkanni, M.D., D.C.H., Dr. Ambigai Meena, M.D., D.G.O., Dr. Lalitha, M.D., D.G.O.,** Additional Professors, Department of Obstetrics and Gynaecology, for their valuable suggestions and guidance in preparing this dissertation.

My grateful thanks to **Asst. Professors** of Department of Obstetrics and Gynaecology, for their immense help during this study. Thanks to my fellow post graduates who had assisted me throughout the study.

I acknowledge the cooperation of the patients without whom this study would not have been possible.

CONTENTS

INTRODUCTION

Caesarean section is the commonest major operative procedure done in the world.

Incidence of caesarean section is increasing throughout the world because of social factors like advanced maternal age, improved surgical techniques and higher detection of fetal distress.

Although caesarean delivery is much safer today due to improved techniques but still it is a major cause of intra operative and post operative complications with higher morbidity and mortality than with vaginal delivery.

Although caesarean delivery is more traumatic than an easy vaginal delivery but an elective caesarean section is preferred over a difficult vaginal delivery to reduce maternal and neonatal morbidity and mortality.

Obstetric blood loss is one of the feared complications of child birth. Blood loss during caesarean section is twice than that of vaginal delivery. During placental delivery the fibrinolytic system gets activated which can last for upto 6-10 hours causing post partum bleeding. Fibrinolytic activity in the endometrium of patients with dysfunctional uterine bleeding will also be high.

So, antifibrinolytics will be effective in reducing the blood loss during caesarean section and in DUB related menorrhagia.

Postpartum haemorrhage contributes to 25% of global maternal death. So death due to PPH should be prevented.

The present study observes the blood loss reduced by Tranexamic acid, an antifibrinolytic agent during and after caesarean section.

AIM OF THE STUDY

1. To evaluate the efficacy of preoperative parenteral tranexamic acid in reducing the blood loss during and after caesarean section.
2. To compare it with the amount of blood loss in patients who did not receive tranexamic acid prior to caesarean section.

REVIEW OF LITERATURE

Definition of Caesarean Section :

Caesarean section is defined as the surgical procedure by which baby is delivered after 28 completed weeks of gestation from an intact uterus through abdominal and uterine incision.

Incidence :

Caesarean section is the commonest major operative procedure done in the world. Its incidence has been quadrupled between 1965-1988 because of various factors. Current rate of caesarean section in most of the countries is between 25-40%. But WHO says that there may be no health benefits from caesarean section rates exceeding 15%.

A mandatory second opinion was associated with a small but significant reduction in caesarean rate without an adverse effect on maternal or perinatal morbidity (Althabe et al 2004).

Maternal morbidity dramatically increases with caesarean section when compared with vaginal delivery (Burrows et al 2004) and the cost of caesarean section increases two fold than that of vaginal delivery (Henderson et al 2001). So, risks and benefits need to be weighed.

Blood loss during Caesarean Section :

Normal blood loss during vaginal delivery may be up to 500 ml. But a lower value of 300ml should be considered for Asian women as they may be unable to cope up with a large amount of blood loss due to their small build and lower antenatal Hb (Ratnam and Rauf et al 1989).

Blood loss during caesarean section is twice than that of vaginal delivery, that is up to 1000 ml (Driffe 1997).

Post partum haemorrhage is defined as,

1. Blood loss of more than 500 ml following vaginal delivery, more than 1000 ml following caesarean delivery and more than 1500 ml after caesarean hysterectomy.
2. Any post partum blood loss which needs blood transfusion or causes fall in haematocrit by 10% (ACOG-definition).
3. Any postpartum blood loss causing haemodynamic instability or if untreated leads to haemodynamic instability.

Incidence of PPH :

2 to 11% when blood loss is estimated visually (Brant et al 1967) and 20% when blood loss is estimated by quantitative methods (Newton et al 1961).

Blood loss estimated by visual observation method will always be less than that of actual blood loss (Pritchard 1962).

Types of PPH :

- Primary PPH → PPH occurring within 24 hours after the delivery of the baby
- Secondary PPH → PPH occurring 24 hours after the delivery of the baby to 6 weeks postpartum.

Factors causing increased blood loss during Caesarean Section :

Four basic causes are 4TS.

1. Tone loss
2. Trauma
3. Tissue retention
4. Thrombotic defect.

Of these tone loss is common and thrombotic defect is difficult to treat.

1. **Atonicity / Hypotonicity** - 80%

Predisposing factors are

1. Multiparity
2. Anaemia / malnutrition
3. Overdistended uterus – twins, big baby, polyhydramnios
4. Prolonged labour followed by caesarean section
5. Induced labour
6. Fibroids complicating pregnancy
7. Inadverent use of oxytocics in labour
8. Chorioamnionitis
9. Previous H/o PPH
10. Prolonged surgery
11. Drugs – halogenated anaesthetics, $MgSO_4$, Nifedipine.
12. Placenta praevia
13. Abruptio placenta – couvelaire uterus
14. Exteriorised uterine closure
15. Uterine anomalies

2. Trauma – 20 %

Trauma often involves uterine vessels when the incision extends laterally. Traumatic factors causing increased blood loss are,

1. Pfannensteil incision
2. Classical caesarean section
3. Obstructed labour with deeply engaged head
4. Big baby
5. Transverse lie
6. Emergency caesarean section
7. Poor obstetrician's experience

3. Tissue retention – 10%

Placenta accreta, increta and percreta, missed cotyledons and succenturiate placental lobe.

4. Thrombotic defect - 5%

- Inherent bleeding tendencies like VWD, ITP
- Acquired coagulation disturbances like HELLP, abruptio placenta, IUD, septicemia–causing DIC.

Blood Loss Assessment :

In order to reduce the morbidity and mortality of caesarean section blood loss it has to be measured accurately. It can be measured by the following methods.

Clinical Methods	Quantitative methods
1. By subjective characters	1. Gravimetric method
2. Visual estimation	2. Colorimetric method
	3. Electrolyte conductivity method
	4. Blood loss by suction
	5. Blood volume measurements
	6. Radioactivity method

I - Estimation by Subjective characters :

1. Shock Index : (SI)

SI = Heart rate / systolic BP.

Normal value is 0.5 – 0.7. With significant haemorrhage it increases to 0.9 to 1.1.

2. Rule of 30 has been proposed for the general acute management of PPH. If the patient's

i. Systolic BP falls by 30 mmHg

ii. Heart rate raises by 30 bpm

iii. Respiratory rate rises to > 30 / min

iv. Hb or HCt drops by 30%

v. Urine output is < 30 ml / hr

then the patient is most likely to have lost atleast 30% of blood volume and is in moderate shock.

3. Benedetti's Clinical Blood loss Assessment :

Class I (mild shock) - 15% blood loss

- Mild tachycardia
- Normal BP
- Postural hypotension and weakness
- Looking pale

Class II (Moderate shock) - 15 to 25% blood loss

- Severe tachycardia
- Fall in BP
- Thirst sensation
- Oliguria

Class II - 30 – 35% blood loss

- Poor renal and cerebral perfusion resulting in oliguria, confusion and restlessness.

Class IV (severe shock) > 40% blood loss

- Air hunger (Increased RR)
- Anuria
- ECG abnormalities

II – Visual Estimation :

Advantages :

- Inexpensive
- Rapid
- Continuous method

Disadvantages :

- Inaccuracy - blood loss assessment by visual estimation is always less than the actual blood loss (Pritchard et al 1962).
- Intraobserver variation is high.

III – Gravimetric Method :

- Patient weighing method
- Swab weighing method

By measuring the weight of the patient or swabs prior to and after surgery.

1. **Patient weighing method** → allowance must be made for drain, dressings, infusion and tissue removal and insensible water loss.
2. **Swab weighing method**
   - 1 gm weight gain = 1ml blood loss (Bonica and Lyter et al 1951, Harding 1984).

- Swabs must be weighed as soon as possible so that loss by evaporation can be minimized.
- This is the only practically possible and feasible method used in our study.

IV – Colorimetric Method (Roe et al 1962, Thornton et al 1963, Rustad et al 1963).

The washing of the blood contaminated swabs is carried out in a known volume of tap water to which has been added sufficient amount of ammonium hydroxide to give a one in 1000 dilution as a defoaming agent. Blood collected in the suction container has to be added to the water and the concentration of the resultant solution has to be determined.

$$\text{Blood loss in ml} = \frac{\text{Hb\%of the washing fluid x volume of the washing fluid}}{\text{Hb\%of the patient's blood x dilution factor patient's Hb}}$$

V – Blood loss by Suction :

Blood in the suction container can be measured. Inaccuracy in this method can be reduced by,

a) Having measuring cylinder in the suction line

b) Adding defoaming agent to the container.

VI - Electrolyte Conductivity Method :

(Leveen and Rubricius et al 1958)

Using automated blood loss meter based on electrolyte conductivity.

VII – Radioactivity Method : (Murray and Dott's et al 1960)

Intravenous injection of small but known amount of radioisotope should be followed by measuring the radioactivity of blood on swabs collected during operation.

VIII – Blood volume measurements :

a) Dye method – using Evans blue dye which must neither be catabolised nor rapidly lost from the circulation.

b) Radioisotopes like I_{131} labelled albumin or Cr_{51} labelled RBCS can be used preoperatively and measuring the post operative radioactivity by Geiger – Muller count. (Mollison and Veall et al 1955).

Among the above mentioned methods swab weighing method and blood loss from suction container are practically possible and feasible methods that were used in our study.

Reducing the Caesarean section Blood loss :

This can be done by the following measures.

1. Preoperative measures
2. Intra operative measures
3. Post operative measures

Preoperative measures :

1. Improving pre pregnant Hb% and correcting antenatal anaemia
2. Antenatal Hb% and blood grouping and Rh typing.
3. 2 IV line / blood reservation for high risk cases.
4. Avoid excess and prolonged anaesthesia.
5. Correction of coagulation abnormality before surgery in cases of abruptio placenta, IUD and HELLP syndrome.
6. Using antifibrinolytics prophylactically before surgery.

Intra operative measures :

1. Joel Cohen incision – straight transverse incision made 3cm above the pubic symphysis in which rectus sheath is stretched with fingers without cutting with scissors.
2. Lower segment caesarean section (avoiding classical caesarean section)

3. Sharp method of expansion of uterine incision.
4. Following active management of third stage of labour in caesarean section (approved by FIGO in 2003 and recommended by WHO in 2006).
    i. Early administration of oxytocics immediately after the delivery of the baby (oxytocin 10 units is the drug of choice if available - added to the IV drip)
    ii. Controlled cord traction after placental separation
    iii. Uterine massage
5. Interior uterine closure for high risk cases
6. Avoiding undue prolongation of surgery
7. Asking the assistant to push the deeply engaged head from below upwards.
8. Making J shaped or inverted T shaped incision in obstructed labour
9. Using Patwarthans or modified Patwarthans method in cases of obstructed labour to deliver the baby

10. Placental bed drainage would reduce its bulkiness and allowing the uterus to contract and retract thereby aids its delivery (Roger et al 1993).

- Eventhough AMTSL may decreases the incidence of PPH effectively it may be associated with increased nausea and vomiting (Prendiville et al 2003).
- Timing of cord clamping is also an important factor which decides placental separation (Mc Donald 2003).

MISGAV LADACH TECHNIQUE : (Hospital in Jerusalem)

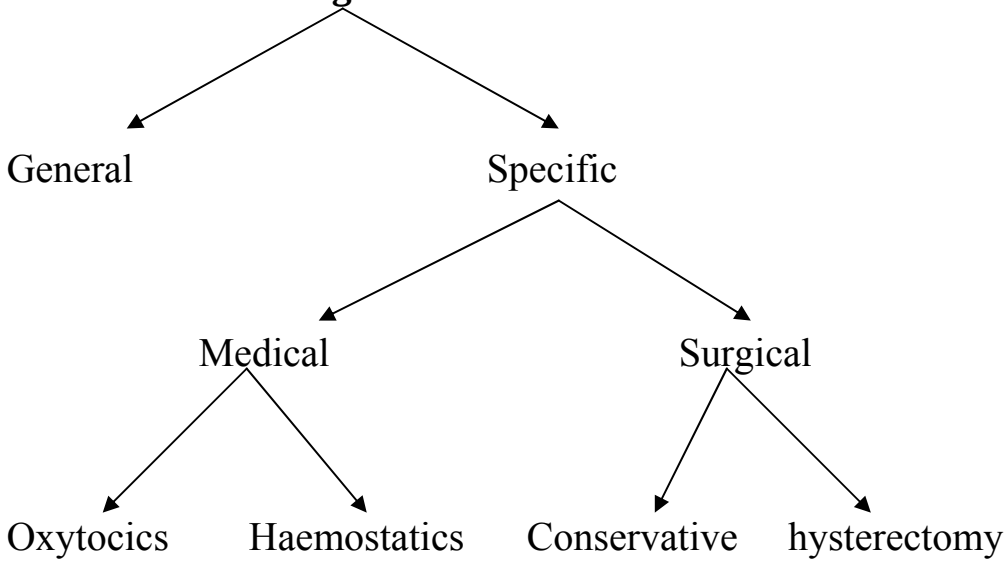
This technique is advised in modern obstetrics to reduce post operative morbidity and has the following components.

1. Joel Cohen abdominal wall incision
2. Exteriorised uterine closure
3. Single layer uterine closure
4. No need for peritoneal closure
5. Rectus muscle should not be approximated.

Post operative measures :

1. Proper post operative monitoring of high risk cases
2. Continuing oxytocics in the immediate post partum period for high risk cases.

Treatment of PPH during Caesarean Section



A systematic and stepwise management of PPH can be achieved with the use of the mnemonic "HAEMOSTASIS."

HAEMO - General Medical Management

H - Ask for help

A - Assess the vital parameters

E - Establish etiology – 4 TS

Ecbolics (oxytocics)

Ensure availability of blood

M - Massage the uterus

O - Oxytocin and prostaglandins

STASIS - Specific surgical Management

S - Shift to operation theatre, Bimanual compression and antishock garments if transfer is required

T - Rule out tissue and trauma and proceed with tamponade test (in vaginal delivery)

A - Apply compression sutures

S - Stepwise devascularisation

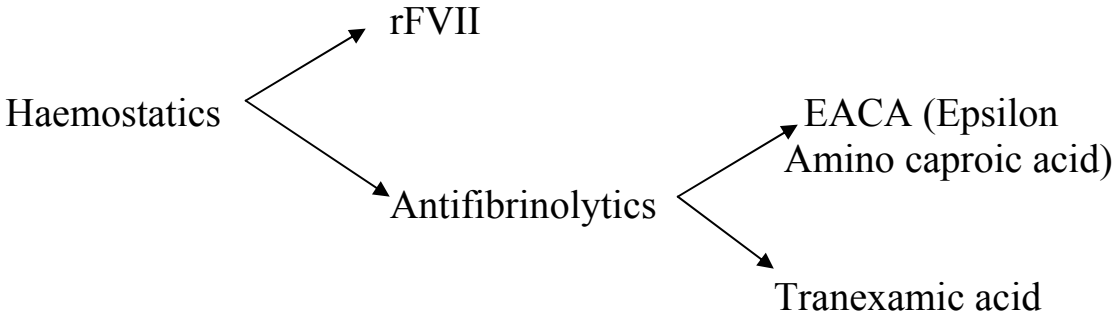
I - Interventional radiology (uterine artery embolisation)

S - Surgery (hysterectomy)

Oxytocics :

1. Oxytocin – 10 units IM/IV infusion should be given immediately after baby delivery.
2. Methyl ergometrine : 0.2 mg IV /IM can be repeated every 15 minutes to a maximum of 5 doses. Contraindicated in heart disease and hypertensives.
3. 15 methyl $PGF_{2\alpha}$ - 250 µg IM can be repeated every 15 minutes to a maximum of 8 doses. It can also be given intra myometrially. It is contraindicated in bronchial asthma patients.

4. Misoprostol (PGE_1) – 600 – 1000µg can be given by intra rectal, vaginal, intra cervical routes. Main side effect is shivering and hyperpyrexia.
5. Syntometrine - 5 units oxytocin with 0.5 mg ergometrine maleate – given IM.



rFVII (Recombinant Factor VII)

- Produced by recombinant technology by transfecting the liver gene into baby hamster kidney cell line.
- Useful in coagulopathic bleeding
- Advantage - No viral contamination
- Disadvantage – cost

Antifibrinolytics :

As the fibrinolytic system gets activated after placental delivery and also in menorrhagia, antifibrinolytics are useful in treating PPH and DUB.

Delayed severe and prolonged haemorrhage from the placental site several hours post delivery may respond to antifibrinolytic therapy if all other measures fail (Bonnar et al 1981).

Tranexamic acid can be given antenatally by oral route for one week to treat women with history of recurrent abruption to get successful neonatal outcome. (Astedt – Nilsson et al 1978).

Tranexamic acid can be used safely and effectively to reduce bleeding resulting from caesarean section. (Tatsumoto K et al 2004, Sekhabat et al).

Tranexamic acid significantly reduces the amount of blood loss during and after caesarean section without any side effects or complications like thrombosis (Gobel Mayer et al 2007).

Prophylactic use of tranexamic acid antenatally in women with bleeding disorders was not associated with any thrombogenic side effects (Lindoff C et al 1993).

Antifibrinolytic tranexamic acid when used preoperatively reduces perioperative allogenic blood transfusion (Cochrane data base 2001).

Antifibrinolytic tranexamic acid when used preoperatively reduces perioperative blood loss in spine surgery (Laporte S et al 2006).

Antifibrinolytic tranexamic acid reduces fibrinolytic bleeding in DUB (Duckitt et al 2005).

Tranexamic acid decreases the heavy bleeding in DUB patients (Mc culy et al 2007).

Tranexamic acid reduces heavy bleeding in DUB patients with menorrhagia (Cochrane data base 2003).

Tranexamic acid effectively reduces the blood loss and blood replacement in total knee replacement surgery (Department of orthopaedic surgery, Sriraj Hospital, Mahidol University, Bangkoh 10700).

Tranexamic acid and aprotinin reduce post operative bleeding and transfusions during primary coronary revascularisation (Robert S. Brown et al).

Tranexamic acid and EACA can be used before dental extraction in haemophilia patients to reduce the bleeding prophylactically. (Walsh PN and Evans BE et al 1975).

Tamponade Test

(Katesmark et al 1994)

Chan et al 1997)

Can be done using Sengstaken blackmore tube either diagnostically or therapeutically.

- If bleeding stops after inflating the bulb → Therapeutic
  - no further surgical intervention needed
- If bleeding continues → Diagnostic
  - further surgery is indicated

Conservative Surgeries :

1. Placental bed suturing (Arulkumaran et al 1999).
2. B Lynch (Lynch et al 1997) pair of vertical brace sutures around the uterus to oppose the anterior and posterior walls and to apply continuous compression.
3. Modified B Lynch (Haymann et al 2002). Similar pair of vertical brace sutures without opening the uterine cavity. It also includes cervico isthmic horizontal opposition sutures.
4. Cho's multiple square technique (Cho et al 2000).
5. Uterine artery ligation (O leary et al 1962).
6. Stepwise devascularisation (Mal abdrabo et al 1994).

- Uterine artery ligation (O Leary et al 1962).
- High and low level uterine artery ligation (Dutta et al 1999).
- Ovarian artery ligation.
- Internal illiac artery ligation (still 1999).

Internal illiac artery ligation (still 1999)

- Controls uterine and vaginal bleeding
- Results in 85% reduction in pulse pressure and 50% reduction in blood flow and converts the arterial pressure system into a venous system.
- 40% success rate.

Uterine Artery embolisation (Ravina et al 1999)

- Polyvinyl alcohol or gel foam particles are injected into uterine arteries via femoral artery catheterization.
- 85 – 95% success rate.

Hysterectomy

Done as a final resort when all measures fail.

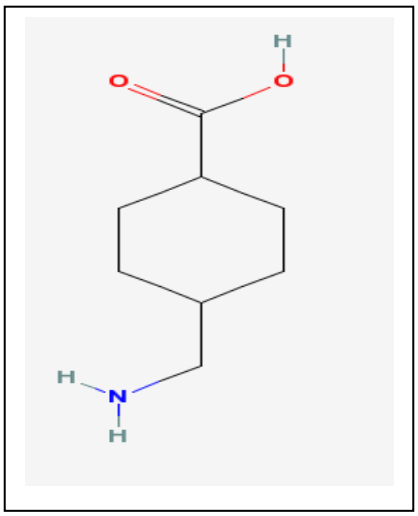
PHARMACOLOGY OF TRANEXAMIC ACID

Tranexamic acid is a synthetic derivative of aminoacid lysine. It is an antifibrinolytic haemostatic agent which controls all types of bleeding mainly coagulopathic bleeding.

Chemical Structure :

It is a Trans – 4 – amino methyl cyclohexane carboxylic acid (AMCA). Molecular Weight – 157.2

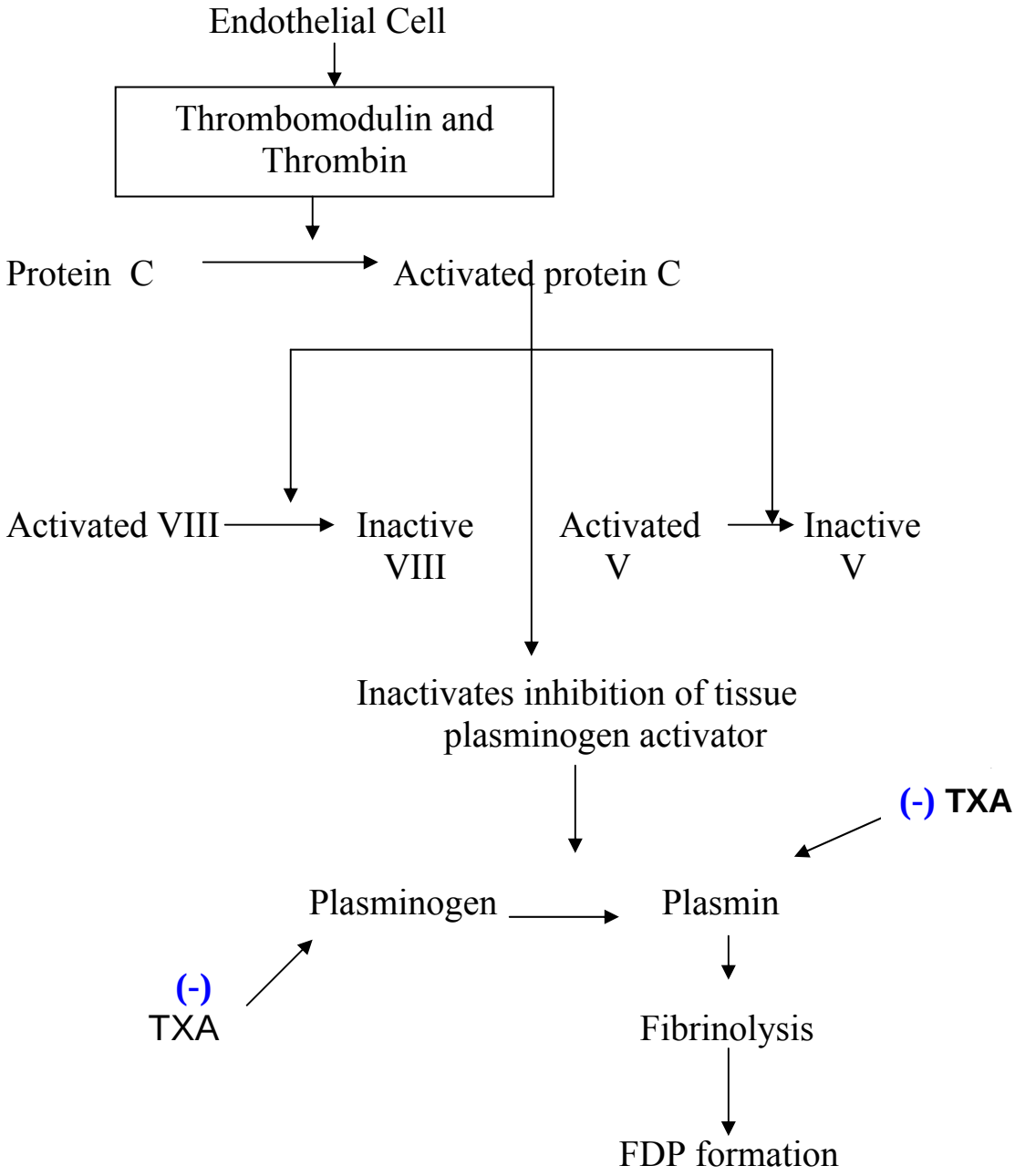
$C_8 H_{15} NO_2$



It is a white crystalline powder. Aqueous solution for injection has a pH of 6.5 – 8.

Pharmacodynamics :

Fibrin is the basic framework for clot formation to maintain haemostasis. This clot has to be lysed after a particular period of time by fibrinolysis by the following way.



Tranexamic acid acts as an antifibrinolytic agent by the following 2 ways.

1. Reversible, competitive blockage of lysine binding sites on plasminogen, so that plasminogen activator cannot bind with plasminogen → at lower doses.

2. Non competitive inhibition of proteolytic action of plasmin similar to EACA. 8-10 times more potent than EACA as it binds strongly with both strong and weak receptors.

At therapeutic concentration (1mg/ml) it will not cause platelet aggregation.

Pharmacokinetics :

- Oral absorption is 30-50%. It is not affected by food
- Only 3% is plasma protein (globulin) bound. Remaining binds with plasminogen. It will not bind with serum albumin.
- Only 5% will be metabolized in liver. Remaining 95% of the drug will be excreted via urine unchanged.
- T ½ → 2- 10 hours. 90% of the drug is excreted in urine within 24 hours of administration.
- Rapidly enter into joint fluid
- Crosses the placenta and blood brain barrier
- 1% of serum level will be achieved in breast milk.

Indications :

This antifibrinolytic agent can be used in all types of bleeding especially coagulopathic bleeding. It can also be used

prophylactically before surgical procedures where excess bleeding will be expected.

1. HELLP, DIC, Thrombasthenia related bleeding
2. Postpartum haemorrhage
3. Dental extraction in haemophilia patients
4. Orthopaedic surgeries like spine surgery and total knee / hip replacement
5. Caesarean section
6. Cardiac surgeries
7. Trans urethral resection of prostate
8. Epistaxis
9. Liver transplantation surgery
10. First line nonhormonal treatment for menorrhagia in DUB / fibroid
11. Hereditary angioneurotic oedema where it decreases the attacks by decreasing plasmin induced complement activation.

Contraindications :

1. Previous H/O thromboembolism or active intravascular clotting or patients with inherited or acquired thrombophiliac states.
2. Renal failure
3. Liver failure
4. Patients with defective colour vision
5. Subarachnoid haemorrhage – because cerebral oedema and infarction may occur rarely.

Side effects :

1. Nausea, vomiting, diarrhoea – commonest side effect, occurs in > 10% cases
2. Giddiness and hypotension – if given by sudden rapid iv occurs in 1-10% of cases
3. Defective colour vision – if used for long time
4. Thromboembolism – rare
5. Drug allergy – rare

Monitoring :

LFT / RFT and colour vision should be checked periodically if used for long time.

Should be used with caution in,

1. Drug allergy patients
2. Renal / liver disease patients
3. Elderly individuals with impaired renal function
4. Pregnancy – as this is a category B drug

Tranexamic acid can be safely used in lactating mothers, because

1. 1% of maternal serum level will be reached in breast milk
2. Only 30-50% absorption occur orally

PREPARATIONS AND DOSAGE :

1. Oral - 500 mg tablets available

   - 25 mg / kg – thrice daily for one week

2. Intravenous

   - Available preparations contain 100 mg / ml (5ml and 10ml ampoules)
   - Dose – 10 mg /kg either direct slow IV or after diluting with 20 ml of 5% dextrose at a rate not more than 1 ml / min. This loading dose can be followed by 1mg / kg / hour IV infusion or 10 mg / kg – thrice daily IV.
   - It can be mixed with aminoacids, electrolytes or carbohydrate solution but not with blood or solutions having penicillin.

3. Mouthwashes containing tranexamic acid are also available and used for haemophilia patients before and after dental extraction because oral mucosa and saliva are rich in plasminogen activator.

* Dose should be adjusted according to creatinine clearance, creative clearance 50 – 80 ml / min - 50% of total dose

10-50 ml/min - 25% of total dose

< 10 ml / min - 10% of total dose

Storage :

Should be stored at 25^{o}C (Room temperature) in a cool, dry place and should be kept away from heat or sunlight.

Drug Interactions :

1. Chlorpromazine increases cerebral vasospasm when combined with Tranexamic Acid, so it should not be combined.
2. Factor IX when given along with Tranexamic Acid there will be increased thrombosis risk. So it should not be combined.

MATERIALS AND METHODS

The subjects of this prospective randomised placebo controlled study were 100 pregnant women who were admitted in the labour ward and planned for caesarean section at Government Rajaji Hospital, Madurai in the time period from May 2009 to November 2009 (6 months).

In all patients detailed history – medical history, obstetric history were taken. Vital parameters checked and basic investigations done. Weight of the patient checked. Detailed general examination and obstetric examination done. Gestational age confirmed by USG.

50 patients were placed in group A and 50 patients were placed in group B. All patients were counselled and informed consent obtained.

Group A received :

1. Inj. Tranexamic acid 10 mg/kg slow direct iv over 5 min – 20 minutes before skin incision.
2. 0.4 mg methyl ergometrine direct iv and oxytocin 10 units in iv infusion immediately after the delivery of the baby.

Group B received

1. Placebo injection of normal saline 5 ml 20 minutes before skin incision.
2. 0.4 mg methyl ergometrine direct IV and oxytocin 10 units in iv infusion immediately after the delivery of the baby.

Inclusion Criteria :

1. Primi and 2nd gravida
2. More than 38 weeks of gestation.
3. Elective and emergency cases with spontaneous onset of labour.

Exclusion Criteria :

Women with risk factors for PPH were not included in this study.

1. Haemoglobin < 8gm%
2. Twin pregnancy
3. Polyhydramnios
4. EFW > 4 kg
5. Previous H/O PPH
6. Fibroid complicating pregnancy
7. Preeclampsia
8. Placenta previa

9. Abruptio placenta
10. Induced labour
11. Prolonged and obstructed labour
12. Heart disease complicating pregnancy
13. Renal / liver disease patients
14. Patients on anticoagulants
15. Previous H/O thromboembolism
16. Gravidity ≥ 3

Methods :

Group A and Group B patients received the injections as above mentioned. In each case the following parameters were noted.

1. Preoperative PR / BP / RR / Hb%
2. Intra operative blood loss from placental delivery to end of surgery.
3. Post operative blood loss from the end of surgery to 2 hours post partum.
4. Post operative PR, BP, RR, Hb%
5. Side effects of the drug
6. Maternal needs for blood transfusion were noted.
7. Post operative period and the maternal outcome till discharge were noted.
8. Neonatal outcome was also noted.

Measurement of Blood loss :

In our study blood loss was measured by measuring the blood in the suction container after placental delivery and by weighing the swabs before and after surgery.

1 gm of swab weight = 1 ml of blood

(Bonica and Lyter 1951 / Harding 1984)

$$\text{Total blood loss (ml)} = \left[\text{Swab weight after surgery(gm)} - \text{Swab weight before surgery(gm)}\right] + \text{Blood in the suction container (ml)}$$

Eventhough this gives only the approximate amount of blood lost it is the only practically possible and feasible method. So these methods were used in our study.

After collecting all the data, the data were tabulated in a master chart and analysed. Data analysis was done with the help of computer using Epidemiological information package (2008).

Using this software frequencies, percentage, mean, Standard Deviation, chisquare and 'p' values were calculated. Kruskul Wallis chi square test was used to test the significance of difference between quantitive variables and Yate's test for qualitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

A - PROFILE OF CASES STUDIED

Table 1 – Age Distribution

Age in Years	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Less than 20	2	4	2	4
20-24	23	46	25	50
25-29	22	44	20	40
30 and above	3	6	3	6
Total	50	100	50	100
Mean SD	24.8 Years 3.2 Years		24.5 Years 3.6 Years	
P	0.6011 (Not significant)			

The Mean age of the cases in both the group doesn't differ significantly.

48% (24/50) of the patients belong to the age group of 20-24 years and 42% (21/50) of the patients belong to the age group of 25-29 years.

Table 2 – Antenatal care

Antenatal care	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Booked	20	40	22	44
Unbooked	30	60	28	56
Total	50	100	50	100
P	0.8394 (Not Significant)			

Antenatal booking does not differ in both groups significantly.

60% (30/50) of the patients in group A and 56% (28/50) of the patients in group B were unbooked.

Table 3 – PARITY

PARITY	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
PRIMI	12	24	17	34
2nd Gravida	38	76	33	66
Total	50	100	50	100
P	0.378 (Not significant)			

12 patients in group A and 17 patients in group B were primi gravida (29%).

38 patients in group A and 33 patients in group B were 2nd gravida (71%) .

Both were comparable in both groups.

Table 4 - Subjective characters

Characters	Group-A		Group-B		'p'
	Mean	SD	Mean	SD	
Height (cms)	158.7	6.9	158	4.4	0.1741 (Not Significant)
Weight(Kg)	55.7	5.5	56	4.7	0.8682 (Not Significant)
BMI	22.1	1.6	22.4	1.3	0.4339 (Not Significant)

The average height in group A was 158.7 cm and in group B was 158 cm. Average weight in group A was 55.7kgs and in group B was 56 kgs.

Subjective characters doesn't differ significantly in between the two groups and all parameters were comparable between the two groups.

Table 5 – Type of Surgery

Type of Surgery	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Emergency	17	34	11	22
Elective	33	66	39	78
Total	0.2655 (Not Significant)			

66% of the cases in group A and 78% of the cases in group B underwent elective caesarean section. 34% of the cases in group A and 22% of the cases in group B underwent emergency caesarean section.

B : COMPARISION BETWEEN THE TWO GROUPS

Table 6 – Changes in vital Parameters

Parameters	No of Cases in				'p'
	Group-A		Group-B		
	Mean	SD	Mean	SD	
Pulse rate (per Min)					
Pre operative	82.5	1.8	82.2	2.2	0.2534(NS)
Post operative	84.4	1.9	87.2	3.1	0.0001(S)
Change	1.9	1.3	5.5	2.8	0.0001(S)
% of Change	2.3	1.5	6.7	3.5	0.0001(S)
Systolic BP(mm/Hg)					
Pre operative	115.0	5.2	116.5	5.2	0.2479-NS
Post operative	114.04	5.1	113.1	4.8	0.2372-NS
Change	-0.96	2.66	-3.4	4.45	0.0024-S
% of Change	-0.81	2.21	-2.84	3.71	0.0023-S
Diastolic BP (mm/Hg)					
Pre operative	74	7.6	78.5	4.6	0.0022-S
Post operative	74.02	5.4	74.3	5.2	0.762-NS
Change	0.02	7.2	-4.2	4.5	0.0001-S
% of Change	0.03	3.2	-5.2	5.7	0.0001-S
Respiratory rate (per min)					
Pre operative	18.64	1.31	18.4	1.71	0.4024-NS
Post operative	18.92	1.35	18.52	1.66	0.1825-NS
Change	0.28	0.7	0.12	0.63	0.0912-NS
% of Change	1.56	3.92	0.75	3.92	0.0998-NS

S - Significant NS – Not Significant

Mean increase in pulse rate in group A was 1.9/min and in group B was 5.5/min. Mean fall in systolic BP in group A was -0.96mmHg and in group B was -3.4mmHg. Mean fall in diastolic BP in group B was -4.2mmHg and mean increase in diastolic BP in group A was 0.02 mmHg. Mean increase in RR in group A was 0.28 and in group B was 0.12.

PR increases and BP decreases significantly in group B compare with group A post operatively. RR increases post operatively more in group B than in group A but without statistical significance.

Table 7 - Changes in Hb - gms%

Hb - gms%	Group-A		Group-B		'p'
	Mean	SD	Mean	SD	
Pre operative	9.12	0.53	9.27	0.47	0.0516 Not Significant
Post operative	9.04	0.49	8.79	0.38	0.0348 Significant
Change	-0.08	0.11	-0.48	0.25	0.0001 Significant
% of Changes	-0.81	1.14	-5.16	2.5	0.0001 Significant

Post operative haemoglobin was significantly reduced in control group compare to study group.

Mean fall of Hb% in group A was -0.08 and in group B was -0.48.

Table 8 – Blood Loss

Blood Loss (ml)	Group-A		Group-B		'p'
	Mean	SD	Mean	SD	
PD – EOS	246.6	29.6	354.8	29.9	0.0001 Significant
EOS-2 hr/pp	46.2	6.5	79	7.2	0.0001 Significant
PD – 2 hr/pp	292.8	32.6	433.8	34.1	0.0001 Significant

PD - Placental Delivery

EOS - End of surgery

2hr PP- 2 hours postpartum

Blood loss was significantly high in control group compare to study group in all periods.

Mean total blood loss in group A was 292.8 ml and in group B was 433.8 ml.

Table - 9

Total blood loss

Total blood loss	No of Cases in			
	Group-A		Group-B	
	No	%	No	SD
< 500ml	49	98	46	92
> 500ml	1	2	4	8
Total	50	100	50	100
P	0.1811 (Not Significant)			

Total blood loss of more than 500 ml was more in control group than in study group, but without statistical significance.

98% (49/50) of patients in Group A had < 500 ml blood loss. Only 2% (1/50) of patient in Group A had > 500 ml blood loss whereas 8% (4/50) of patients in Group B had > 500 ml blood loss.

Table 10 – Maternal blood transfusion

Maternal blood transfusion	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Given	1	2	4	8
Not given	49	98	46	92
Total	50	100	50	100
P	0.1811 (Not Significant)			

Need for maternal blood transfusion doesn't differ significantly between the two groups.

1 patient in group A and 4 patients in group B needed blood transfusion.

Table 11 – Maternal Complications

Maternal Complication	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Vomiting	5	10	3	6
Fever	1	2	4	8
Total	6	12	7	14
P	0.5698 (not significant)			

5 patients in group A and 3 patients in group B had post operative vomiting. One patient in group A and 4 patients in group B had fever post operatively.

This doesn't have statistical significance.

Table - 12

Hospital stay after 8th POD

Hospital stay after 8th POD	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Yes	0	0	2	4
No	50	100	48	96
P	0.2475 (Not significant)			

POD – Post operative day

2 patients stayed after 8th POD in group B and none of the patients in group A were stayed after 8th POD. This doesn't have any statistical significance.

Table - 13

NICU Admission

NICU Admission	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Yes	1	2	2	4
No	49	98	48	96
P 0.5 (Not Significant)				

NICU admission doesn't differ significantly between the two groups .One baby in group A and 2 babies in group B needed NICU admission.

DISCUSSION

As obstetric blood loss contributes to one fourth of global maternal death, death resulting from PPH should be avoided.

As the fibrinolytic system gets activated after placental delivery antifibrinolytic agents can be used to reduce obstetric blood loss.

As prevention is always better than cure regarding PPH- an antifibrinolytic agent tranexamic acid was used prophylactically in our study to observe its efficacy in reducing blood loss during and after caesarean section.

1. Maternal age : In our study, the age group of patients included varied from 18 to 35 years. Maximum percentage of patients belong to the age group of 20-24 years. 40% of group A and 50% group B were between 20-24 years. In a study conducted by department of Obst & Gynae Medical college and SSG hospital, Baroda, Gujarat the mean age was 24 years.

2. Antenatal Care : In our study, 40% of group A and 44% of group B were booked. 60% of group A and 56% of group were unbooked. In a similar study conducted by International Medical Communication Department, Daiichi Pharmaceutical Co. Ltd,

Tokyo, Japan, 66% of study group and 68% of control group were booked. Proper antenatal care is important to identify the high risk factors in the antenatal period itself and to correct them thereby reducing the incidence of PPH.

3. Parity : In our study, second gravida were more in both groups than primigravida. All were Singleton pregnancies. In group A 24% were Primigravidas and 76% were 2nd gravidas. In group B – 34% were Primigravidas and 66% were 2nd gravidas. In a similar study conducted by Department of obst & Gynec Medical College and SSG hospital, Baroda, Gujarat also second gravidas were 70% and primigravidas were 30%.

4. Subjective characters : In our study mean height was 158.7 cm in group A and 158 cm in group B. Mean weight was 55.7 kg in group A and 56 kg in group B. Mean BMI was 22% in group A and 22.4 in group B. In a similar study conducted by Department of Obs & Gyne of Peking Union Medical College hospital, Chinese academy of Medical Sciences, Beijing 100730, China, where mean height was 161 cm and mean weight was 72 kg.

5. Type of Surgery : In our study, 34% of group A and 22% of group B were emergency cases. 66% of group A and 78% of group B were elective cases. Both were comparable in both groups.

6. Vital parameters : In our study, mean postoperative increase in PR was 1.9 in group A and 5.5 in group B. Mean postoperative fall in SBP was - 0.96 in group A and -3.4 in group B. Mean postoperative increase in RR was 0.28 in group A and 0.12 in group B. There was a significant fall in SBP and rise in PR without any significant change in RR post operatively. In a similar study conducted by International Medical Communication department, Daiichi Pharmaceutical Co. Ltd, Tokyo, Japan also there was a statistically significant change in vital parameters.

7. Blood loss : In our study, there was a statistically significant reduction of blood loss in both periods, that is from placental delivery to end of surgery and also from the end of surgery to two hours post partum. Mean blood loss from PD to EOS in group A was 246.6 ml and in group B was 354.8 ml. Mean blood loss from the end of surgery to 2 hour post partum was 46.2 ml in group A and 79ml in group B. Mean total blood loss was 292.8ml in group A and 433.8 ml in group B. In contrast in a study conducted by Shanghai

International Peace Maternity and Child health hospital, Shanghai, China also blood loss was reduced in both periods. But the blood loss reduction from PD-EOS was not statistically significant and from EOS to 2 hours post partum and the total blood loss reduction were with statistical significance.

8. Haemoglobin change : In our study statistically significant fall in Hb% occurred after surgery in group B than with group A. Mean fall of Hb% in group A was -0.08 and in group B was -0.48. In contrast in a similar study conducted by Beijing Obst and Gyn hospital, Beijing, China there was also more post operative fall in Hb% in the control group than with the study group but without statistical significance between study and control groups.

9. Total blood loss of more than 500 ml and need for maternal blood transfusion.

In our study, one patient in group A and 4 patients in group B had total blood loss of more than 500 ml who needed blood transfusion. This need was not statistically significant. In a similar study conducted by University Department of Obs & Gyn, Rosie Maternity hospitals, Robinson way Cambridge – CB2 – 2SW – UK, 2 patients in study group and 5 patients in control group had more

than 500 ml of total blood loss and needed blood transfusion. This was also without statistical significance.

10. Maternal complications other than blood loss.

In our study, 5 patients in group A and 3 patients in group B had vomiting in the immediate post operative period which may be related to the drug. But this increased incidence of vomiting in group A was not statistically significant. One patient in group A and 4 patients in group B had fever on 3rd post operative day. Group A patient with fever had dysuria and urine culture was positive for E.coli and treated with antibiotics and discharged on 8th POD.

Among 4 patients, who had fever on the 3rd POD in group B – 2 had breast engorgement as their babies were admitted in NICU. One baby was discharged on 1st POD and another one was on 5th POD. After the discharge of the babies, fever subsided in both patients. Remaining two patients in group B with fever had purulent wound discharge on 5th POD when the dressing was changed. Pus culture and sensitivity done and treated with appropriate antibiotics and daily dressing and discharged on 15th and 16th POD. Eventhough the higher incidence of wound infection in group B was not statistically significant it may be due to minimal blood collection

in the wound in group B. None of the patients in both groups had thromboembolic complications postoperatively.

11. Neonatal Outcome :

In our study, neonatal outcome were comparable in both groups. One baby in group A needed NICU admission for HIE stage I and the indication for LSCS was unengaged head with foetal distress and discharged on 5th POD.

2 babies in group B needed NICU admission for HIE Stage I and for transient tachypnoea of the newborn the indications for LSCS being unengaged head with foetal distress in one and previous LSCS with PROM in another. They got discharged on 1st and 5th POD. The inference was that tranexamic acid use was not associated with any impact on neonatal outcome in our study. In a similar study conducted by Department of Obs & Gyn King's College hospital, London, there was no significant difference in the neonatal outcome between study and control groups.

SUMMARY

- This study was conducted in the Department of Obstetrics and Gynaecology, Government Rajaji Hospital, Madurai to clinically observe the blood loss reduced by tranexamic acid during and after caesarean section.
- 100 patients were selected for the study, 50 as study group (A) and 50 as Control group (B).
- 48% of the cases belong to the age group 20 – 24 years.
- 29% of the cases were primigravida and 71% of the cases were 2^{nd} gravida.
- 28% of the cases were emergency cases and 72% of the cases were elective cases.
- There was no statistically significant difference in the subjective characters in between the two groups.
- Tranexamic acid significantly reduced the blood loss from placental delivery to 2 hour post partum.
- There was statistically significant fall in blood pressure and rise in PR without any significant change in RR in the control group compare to the study group.

- Hb level was significantly reduced in the control group compare to the study group postoperatively but without significant increase in the need for blood transfusion.
- Incidence of vomiting was higher in the study group and wound infection was higher in the control group but without statistical significance. This vomiting may be drug related and wound infection may be related to blood collection in the wound. None of the patients in both the groups had thromboembolic complications postoperatively.
- Neonatal outcome was similar in both the groups.

CONCLUSION

Tranexamic acid injection, an antifibrinolytic agent when given prophylactically 20 minutes before skin incision by intravenous route appears to reduce the blood loss during and after caesarean section effectively.

Some studies demonstrated that tranexamic acid minimally increases the risk of thromboembolism but without statistical significance which was not observed in our study.

So, further studies are also needed to support its efficacy.

PROFORMA

Name : Age : IP No.:

AN Care : Booked / Unbooked

Height : Weight : BMI :

Obstetric Table :

Date and Time of Admission :

Past History :

Menstrual History :

Marital History :

Obstetric History :

General Examination :

PR / minute :

BP mm/Hg :

RR / minute :

CVS :

RS :

Abdominal examination :

Vaginal examination :

Basic investigations :

- Hb %
- Urine
  - Albumin
  - Deposits
  - Sugar
- Blood urea
  - Sugar

Sr.Creatinine

Blood Grouping / typing

PPTCT

LFT

Clotting time

Obstetric USG :

Date and Time of Surgery :

Indication for surgery :

Intra operative blood loss : Placental delivery to EOS (ml)

Post operative blood loss : EOS – 2 hrs PP (ml)

Total blood loss (ml) :

2 hours post partum	PR	/ min
	BP	mm/Hg
	RR	/ min
3rd POD	Hb	gm%

Maternal blood transfusion : Yes / No

Maternal complication :

Neonatal Outcome :

Date & Time of discharge :

Duration of hospital stay :

ABBREVATIONS

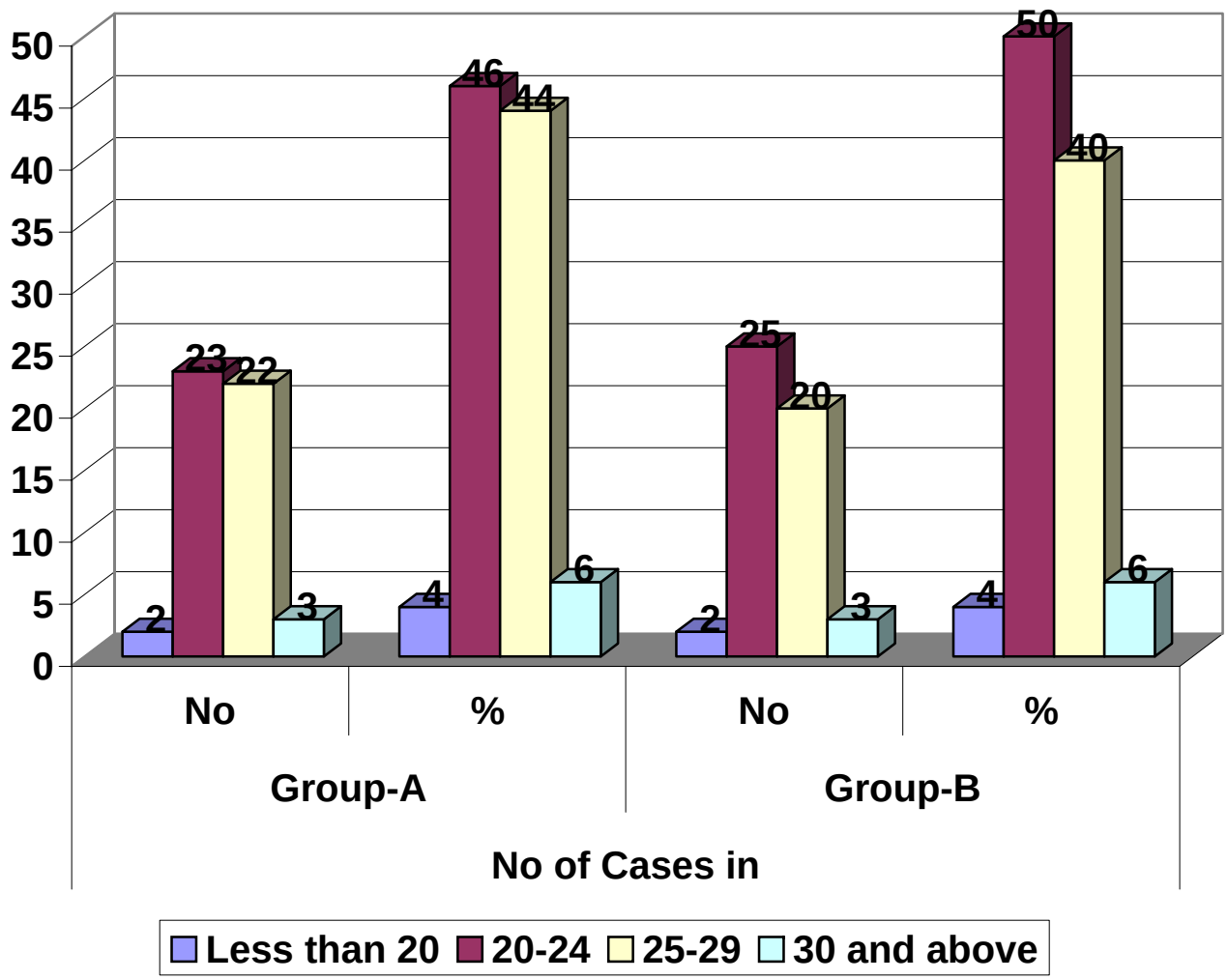
PR	PULSE RATE
SBP	SYSTOLIC BLOOD PRESSURE
DBP	DIASTOLIC BLOOD PRESSURE
RR	RESPIRATORY RATE
HT	HEIGHT
WT	WEIGHT
BMI	BODY MASS INDEX
PD	PLACENTAL DELIVERY
EOS	END OF SURGERY
PP	POST PARTUM
HB	HAEMOGLOBIN
POD	POST OPERATIVE DAY
NICU	NEONATAL INTENSIVE CARE UNIT
LFT	LIVER FUNCTION TEST
RFT	RENAL FUNCTION TEST
EL	ELECTIVE
EM	EMERGENCY
IUD	INTRA UTERINE FETAL DEATH
AMTSL	ACTIVE MANAGEMENT OF THIRD STAGE OF LABOUR
VWD	VON WILLEBRAND'S DISEASE
ITP	IDIOPATHIC THROMBOCYTOPENIC PURPURA
DIC	DISSEMINATED INTRA VASCULAR COAGULATION
DUB	DYSFUNCTIONAL UTERINE BLEEDING
TXA	TRANEXAMIC ACID
CVS	CARDIO VASCULAR SYSTEM
RS	RESPIRATORY SYSTEM
HELLP	HEMOLYSIS, ELEVATED LIVER ENZYMES, LOW PLATELETS

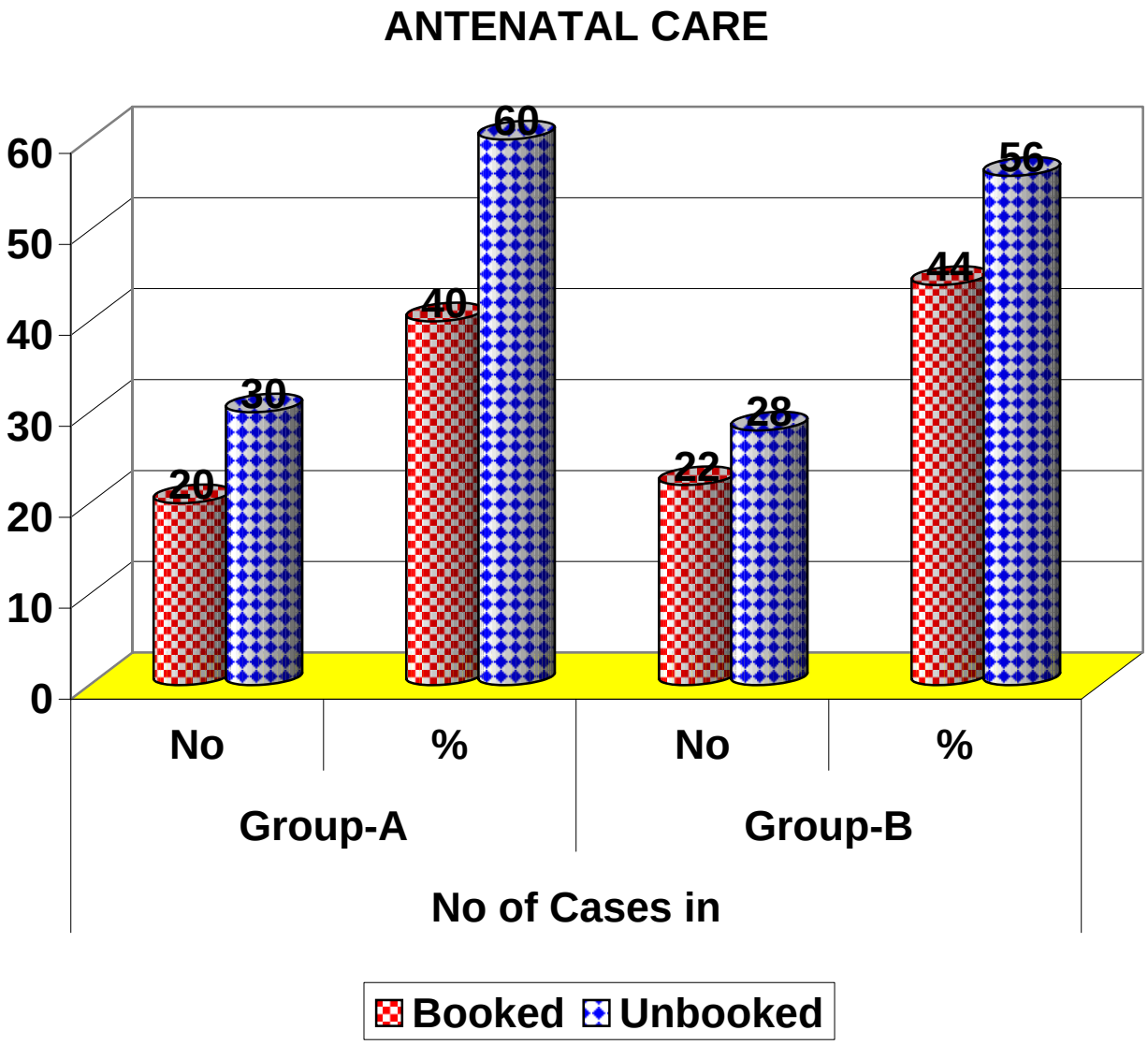
SUCTION APPARATUS

ELECTRONIC WEIGHING MACHINE

TRANEXAMIC ACID

AGE DISTRIBUTION




ANTENATAL CARE
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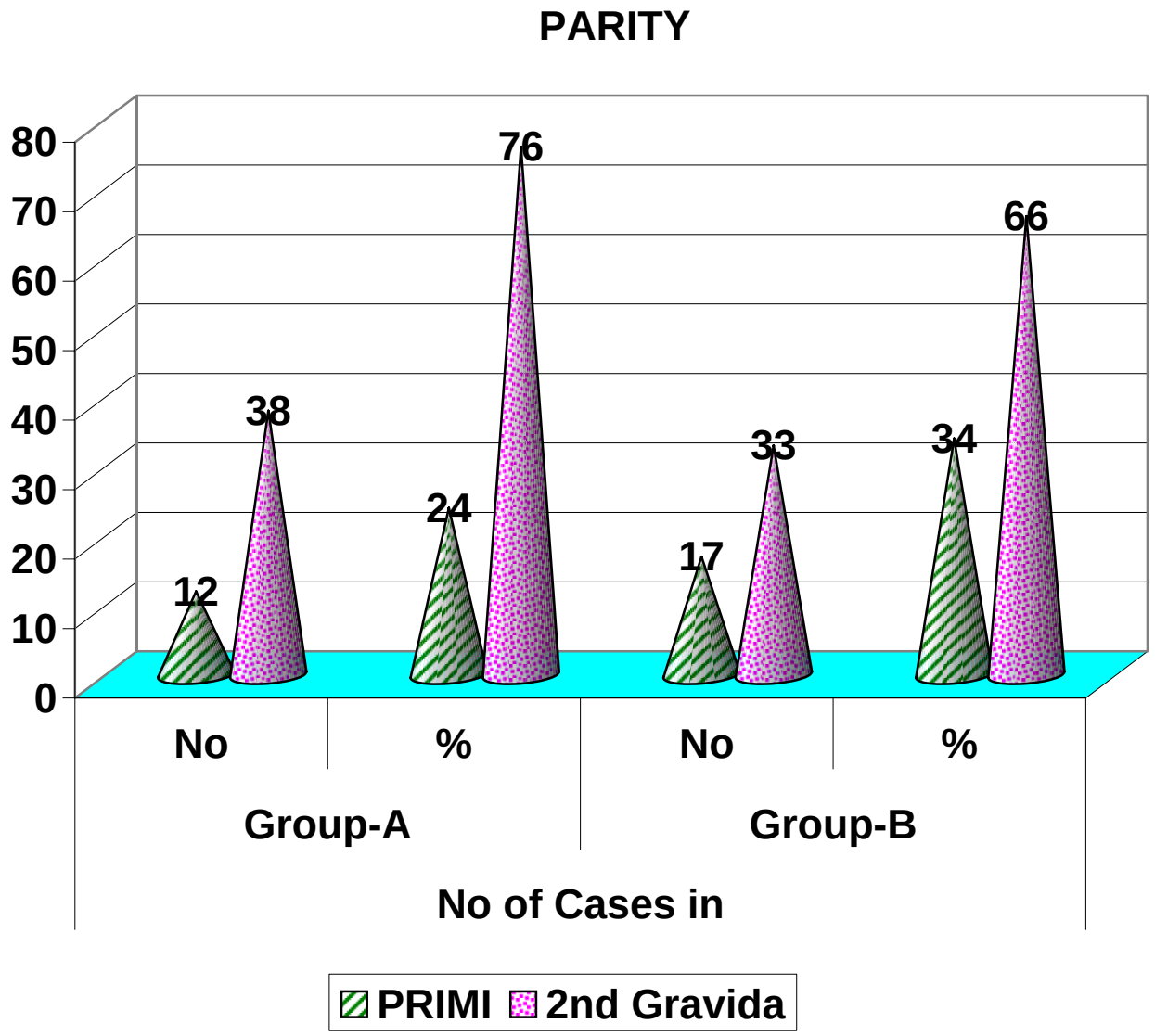
50
40
30
20
10
0
20
30
40
60
22
28
44
56
No
%
No
%
Group-A
Group-B
No of Cases in
Booked
Unbooked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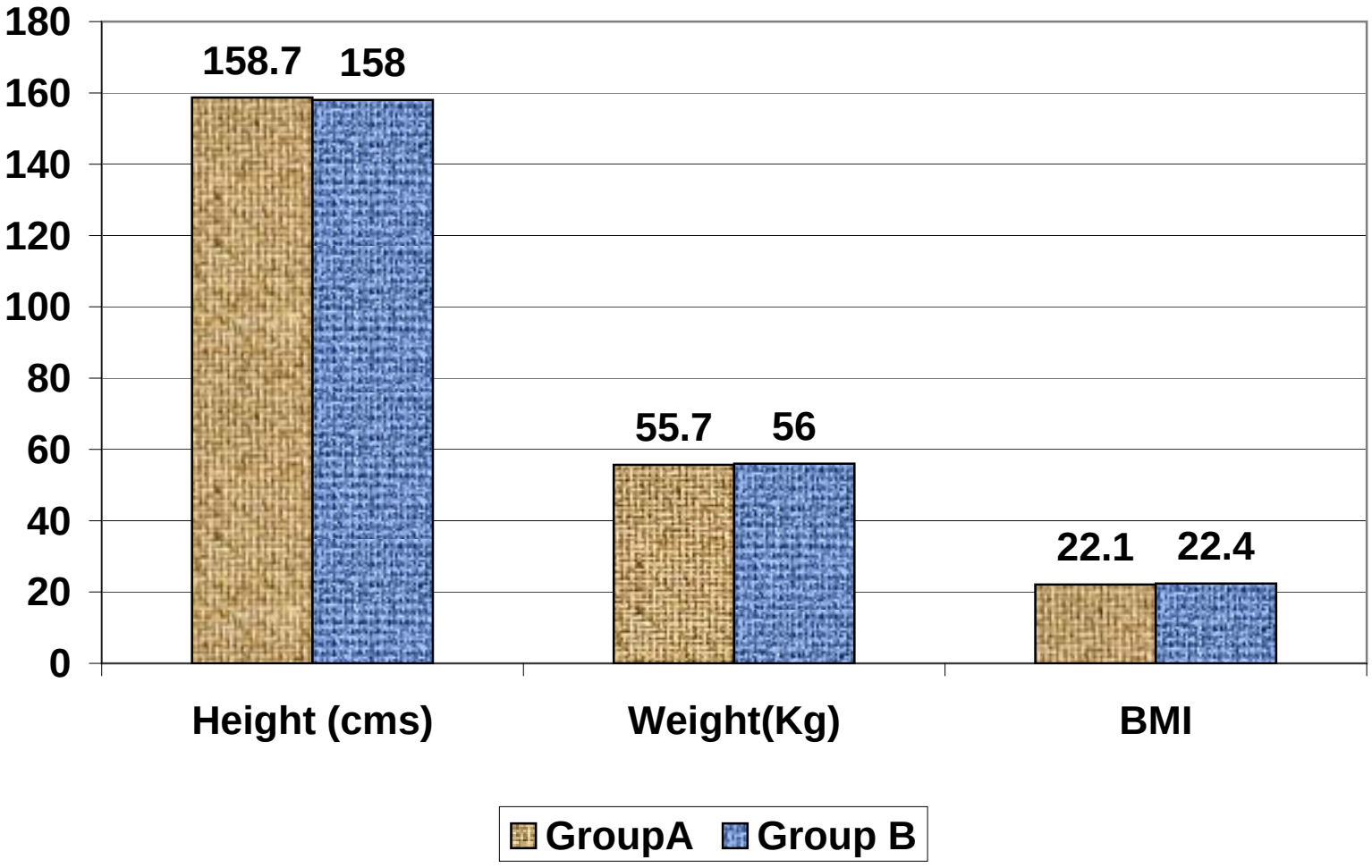
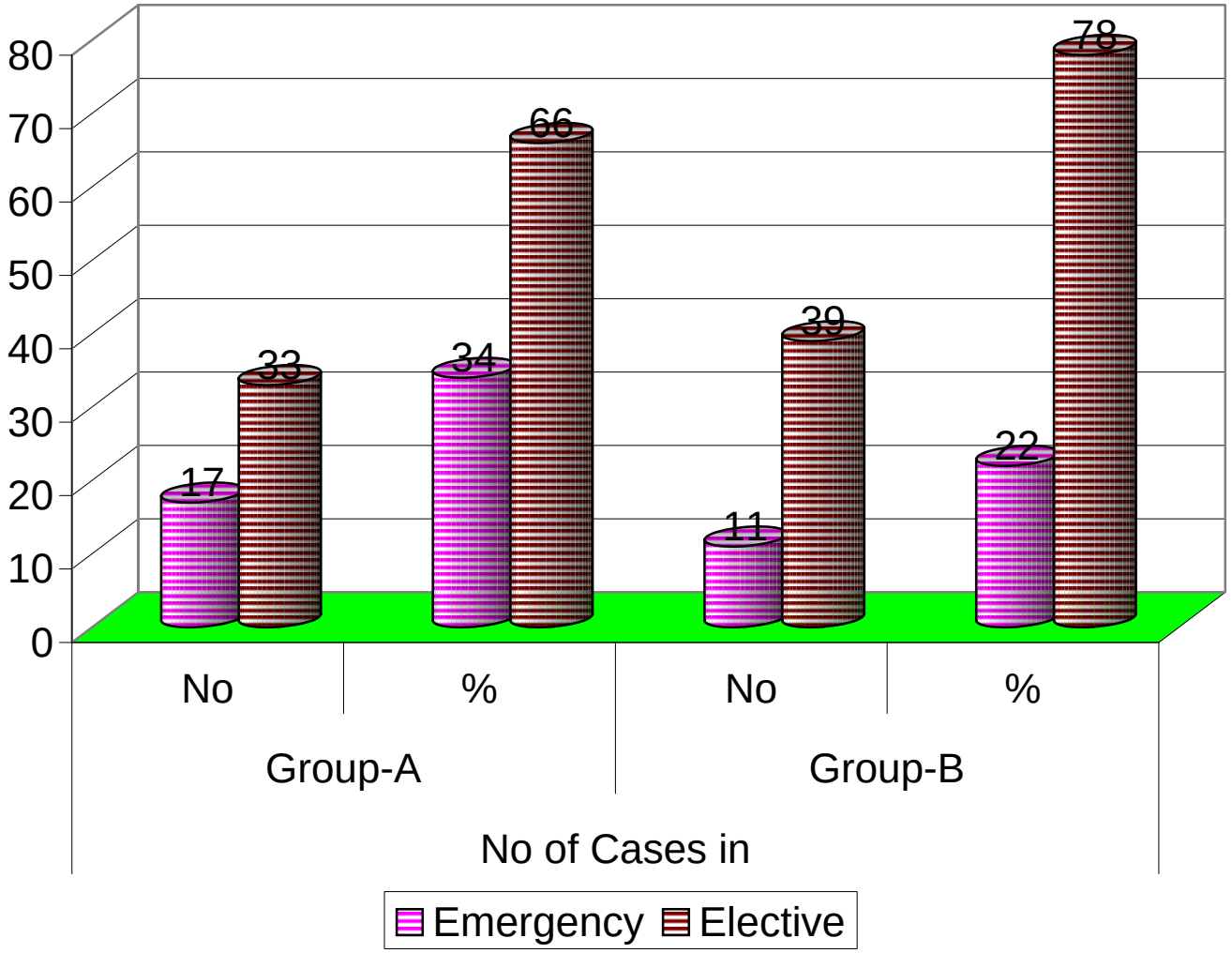
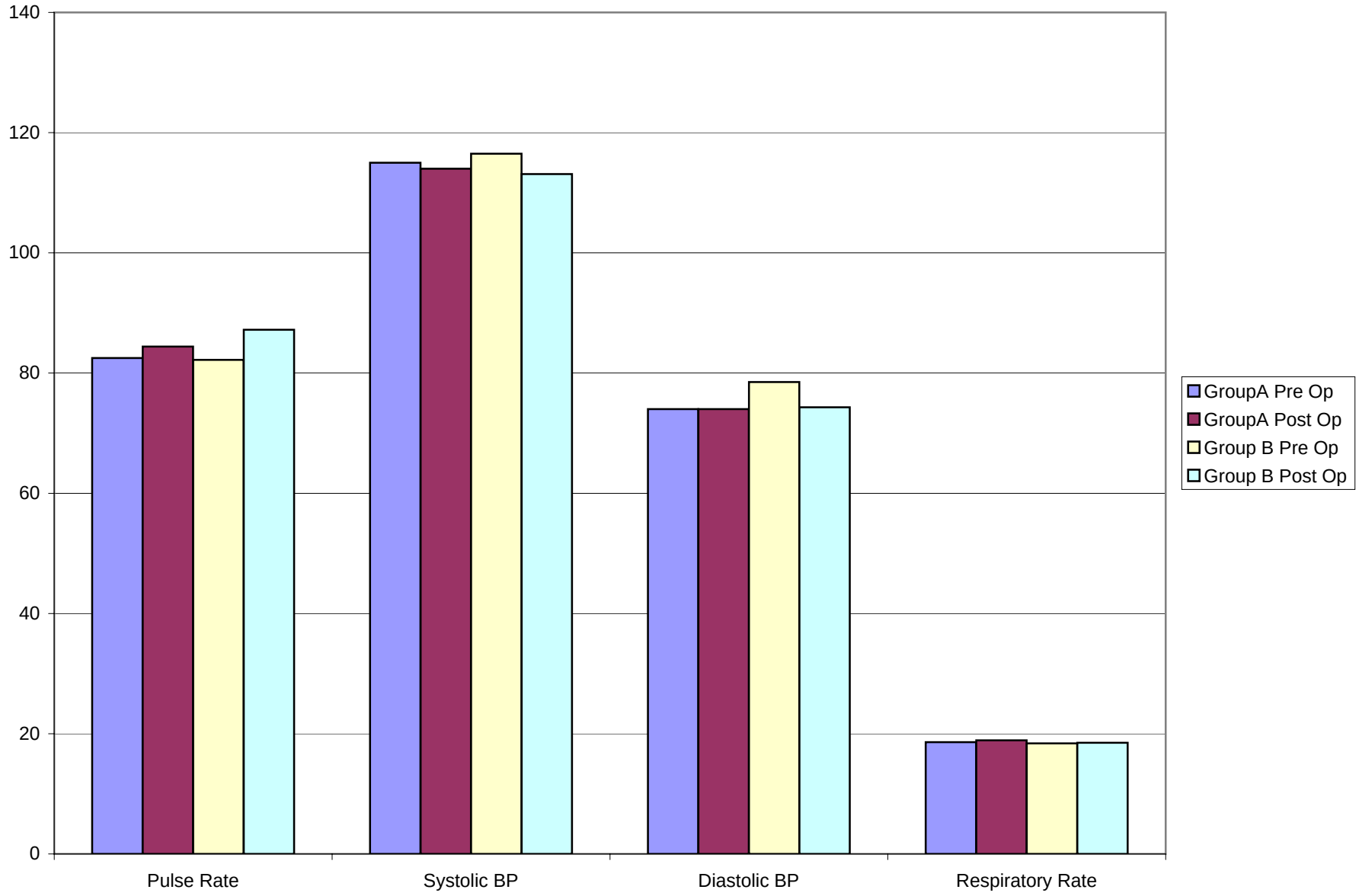
70
60
50
40
30
20
10
0
12
38
24
76
17
33
34
66
No
%
No
%
Group-A
Group-B
No of Cases in
PRIMI
2nd Gravida

SUBJECTIVE CHARACTERS



TYPE OF SURGERY




140
120
100
80
60
40
20
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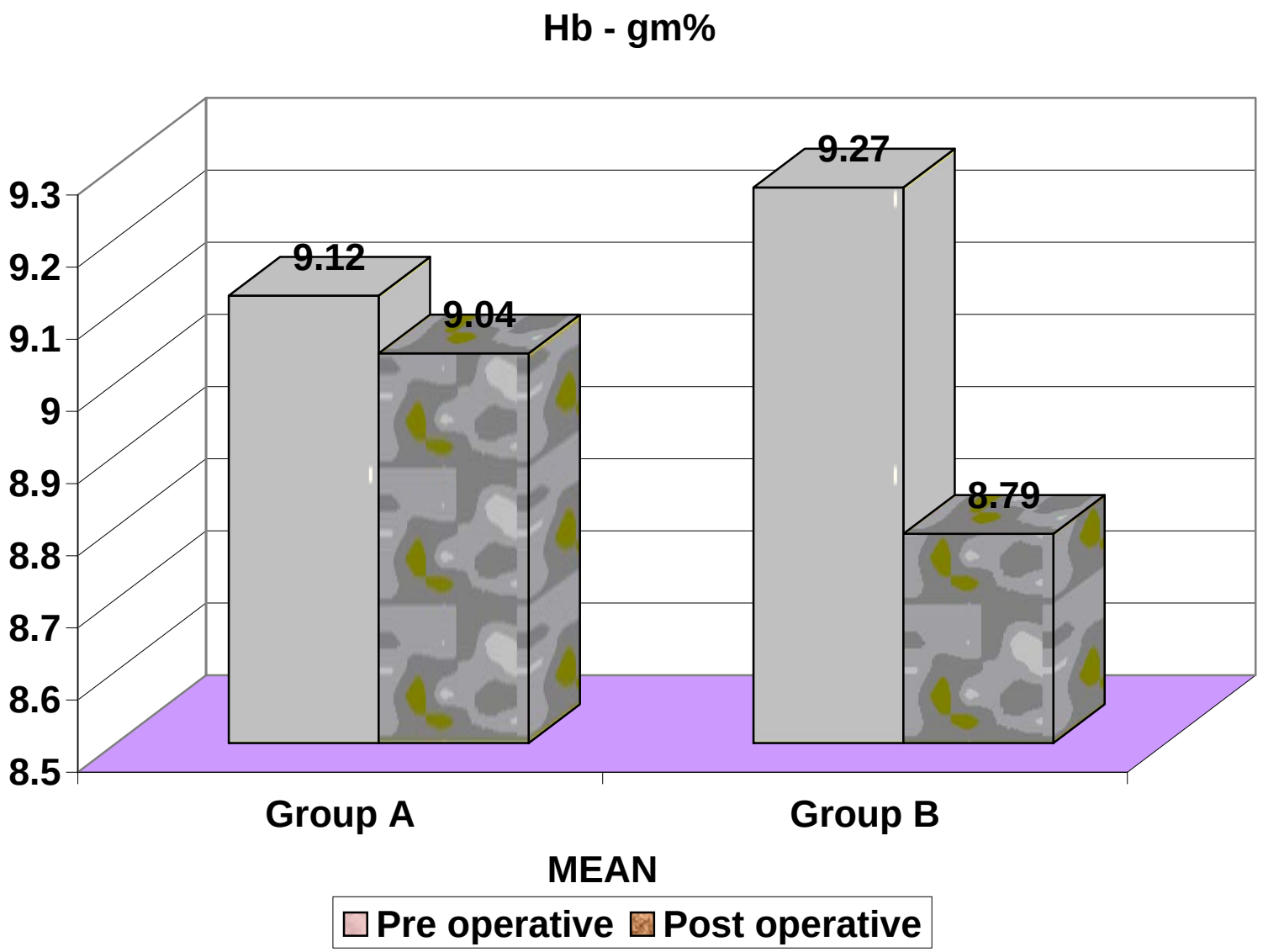
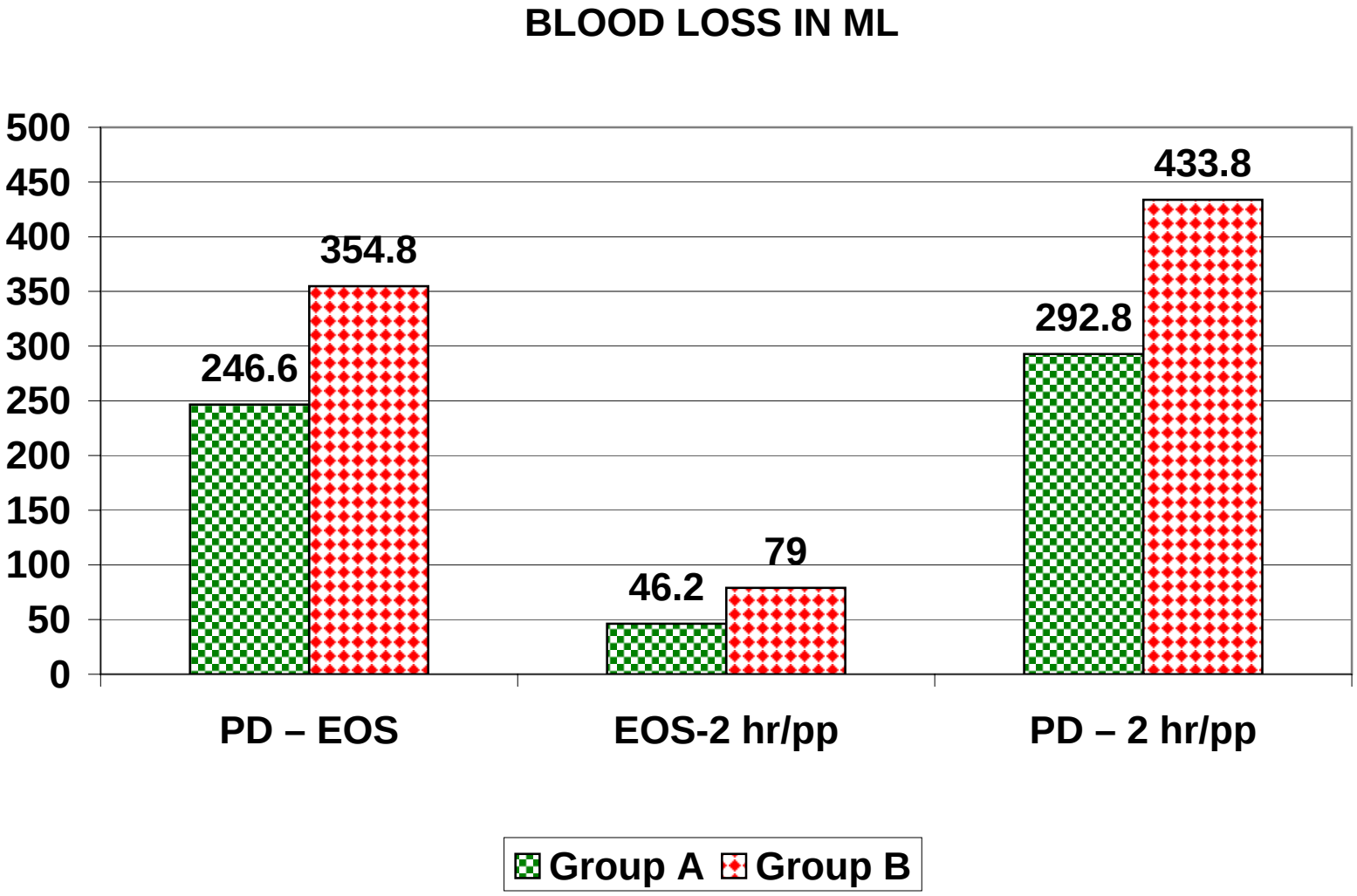
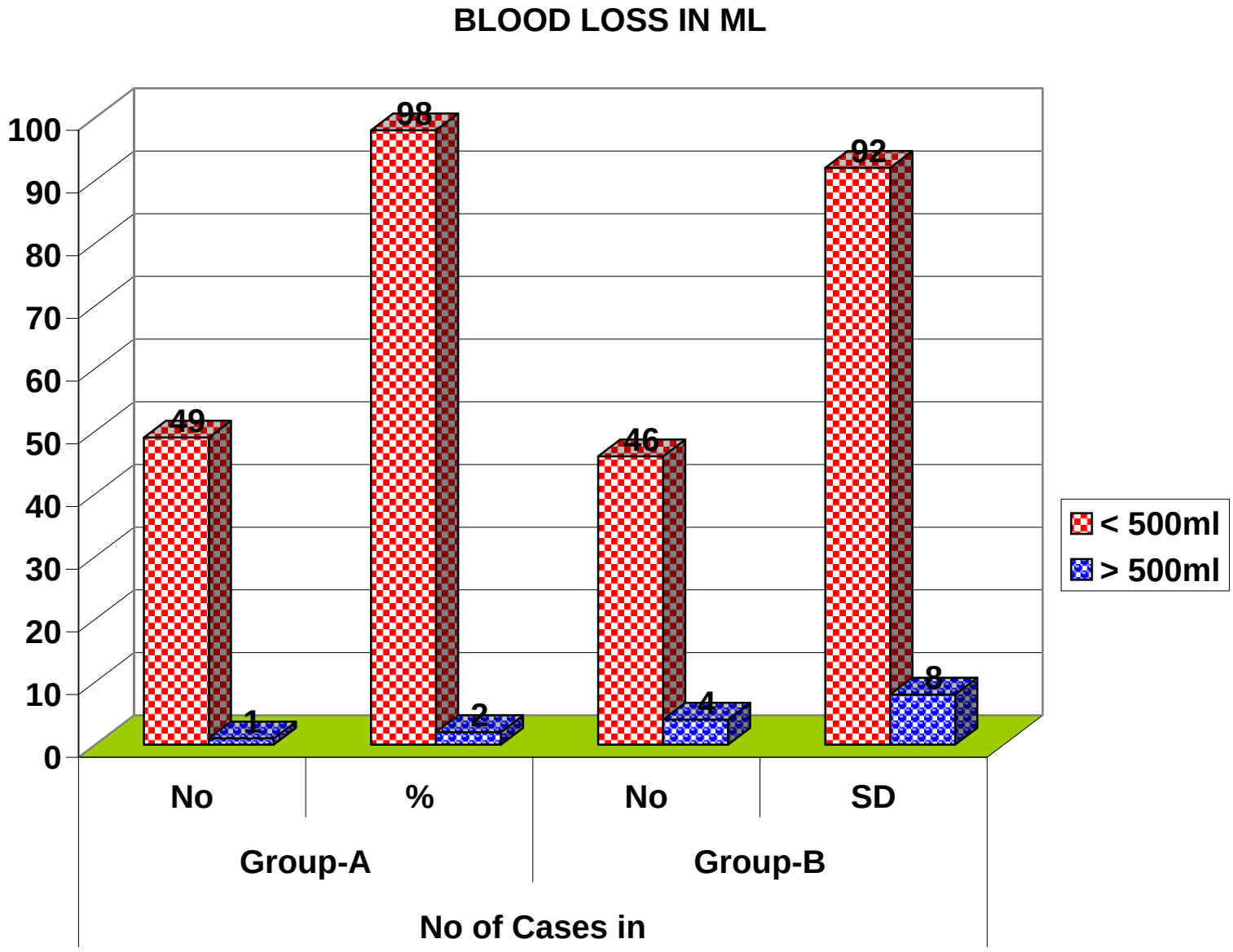
Pulse Rate
Systolic BP
Diastolic BP
Respiratory Rate
GroupA Pre Op
GroupA Post Op
Group B Pre Op
Group B Post Op


Hb - gm%
9.3
9.2
9.1
9
8.9
8.8
8.7
8.6
8.5
9.12
9.04
9.27
8.79
Group A
Group B
MEAN
Pre operative
Post operative


BLOOD LOSS IN ML
500
450
400
350
300
250
200
150
100
50
0
246.6
354.8
46.2
79
292.8
433.8
PD – EOS
EOS-2 hr/pp
PD – 2 hr/pp
Group A
Group B


BLOOD LOSS IN ML
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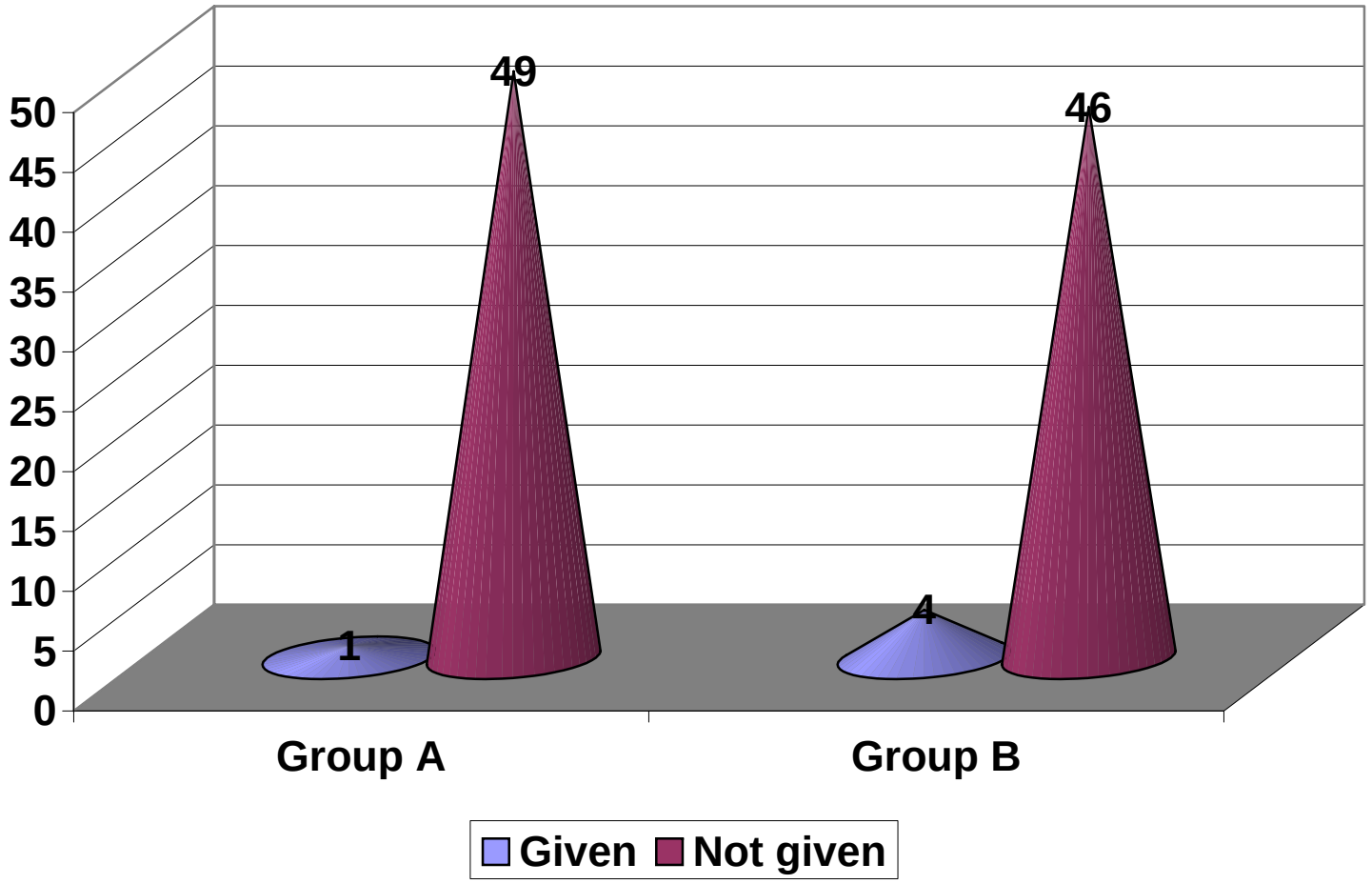
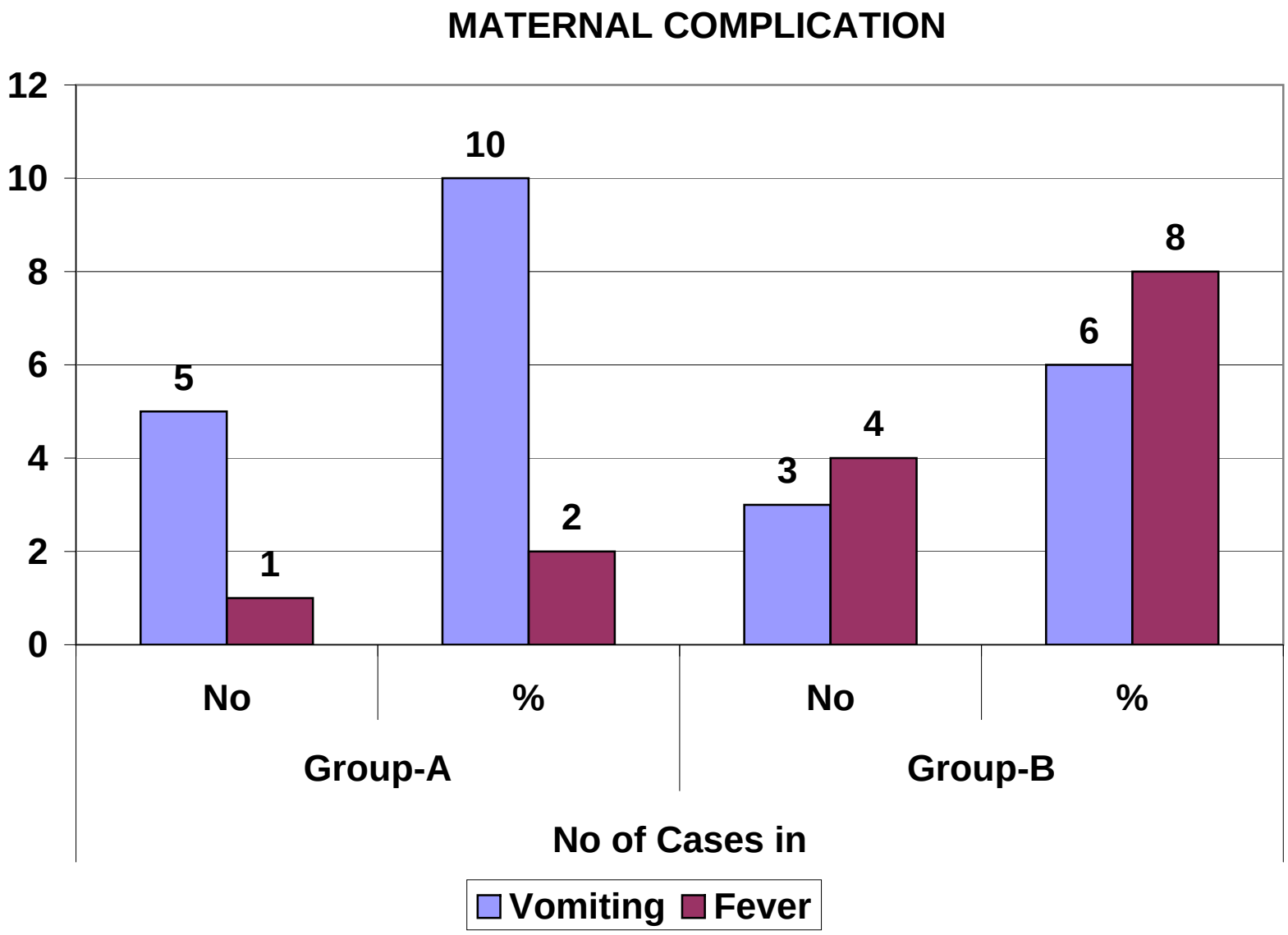
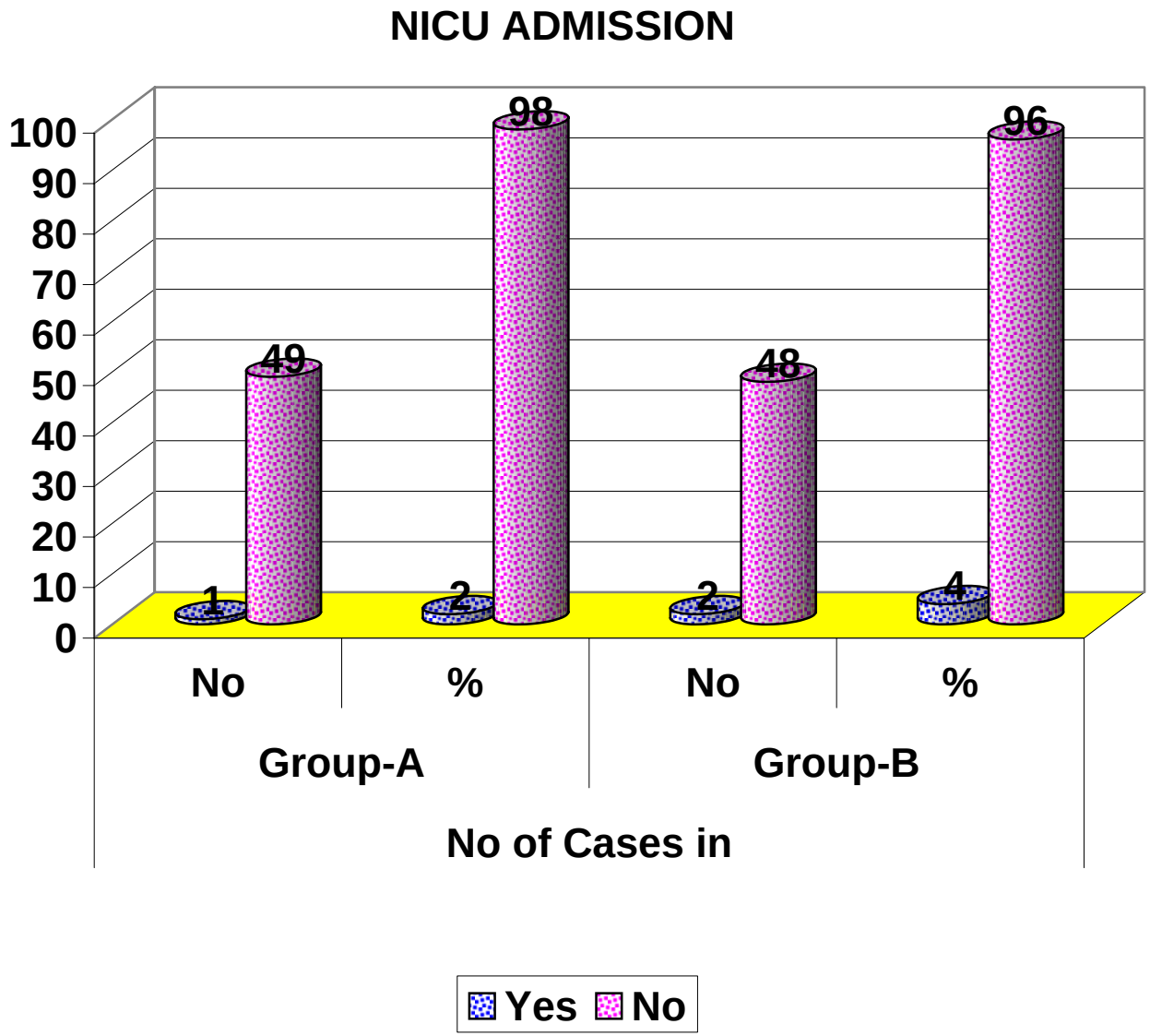
90
80
70
60
50
40
30
20
10
0
49
1
98
2
46
4
92
8
< 500ml
> 500ml
No
%
No
SD
Group-A
Group-B
No of Cases in

MATERNAL BLOOD TRANSFUSION




MATERNAL COMPLICATION
12
10
8
6
4
2
0
5
1
10
2
3
4
6
8
No
%
No
%
Group-A
Group-B
No of Cases in
Vomiting
Fever


NICU ADMISSION
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90
80
70
60
50
40
30
20
10
0
1
49
2
98
2
48
4
96
No
%
No
%
Group-A
Group-B
No of Cases in
Yes
No

Age in Years	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Less than 20	2	4	2	4
20-24	23	46	25	50
25-29	22	44	20	40
30 and above	3	6	3	6

Antenatal care	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Booked	20	40	22	44
Unbooked	30	60	28	56

PARITY	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
PRIMI	12	24	17	34
2^{nd} Gravida	38	76	33	66

Characters	Group-A		Group-B	
	Mean	SD	Mean	SD
Height (cms)	158.7	6.9	158	4.4
Weight(Kg)	55.7	5.5	56	4.7
BMI	22.1	1.6	22.4	1.3

Characters

Characters		
Height (cms)		
Weight(Kg)		
BMI		

Characters	GroupA	Group B
Height (cms)	158.7	158
Weight(Kg)	55.7	56
BMI	22.1	22.4

Type of Surgery	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Emergency	17	34	11	22
Elective	33	66	39	78

Parameters	No of Cases in			
	Group-A		Group-B	
	Mean	SD	Mean	SD
Pre operative	82.5	1.8	82.2	2.2
Post operative	84.4	1.9	87.2	3.1
Pre operative	115	5.2	116.5	5.2
Post operative	114.04	5.1	113.1	4.8
Pre operative	74	7.6	78.5	4.6
Post operative	74.02	5.4	74.3	5.2
Pre operative	18.64	1.31	18.4	1.71
Post operative	1.56	3.92	0.75	3.92

82.5	82.2
84.4	87.2
115	116.5
114.04	113.1
74	78.5
74.02	74.3
18.64	18.4
1.56	0.75

	GroupA		Group B	
Vital Parameters	Pre Op	Post Op	Pre Op	Post Op
Pulse Rate	82.5	84.4	82.2	87.2
Systolic BP	115	114	116.5	113.1
Diastolic BP	74	74	78.5	74.3
Respiratory Rate	18.6	18.9	18.4	18.5

Hb - gms%	Group-A		Group-B	
	Mean	SD	Mean	SD
Pre operative	9.12	0.53	9.27	0.47
Post operative	9.04	0.49	8.79	0.38

Hb -gm%	Group A	Group B
Pre operative	9.12	9.27
Post operative	9.04	8.79

Blood Loss (ml)	Group-A		Group-B	
	Mean	SD	Mean	SD
PD – EOS	246.6	29.6	354.8	29.9
EOS-2 hr/pp	46.2	6.5	79	7.2
PD – 2 hr/pp	292.8	32.6	433.8	34.1

Blood Loss (ml)	Group A	Group B
PD – EOS	246.6	354.8
EOS-2 hr/pp	46.2	79
PD – 2 hr/pp	292.8	433.8

Total bloodloss	No of Cases in			
	Group-A		Group-B	
	No	%	No	SD
< 500ml	49	98	46	92
> 500ml	1	2	4	8

Maternal blood transfusion	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Given	1	2	4	8
Not given	49	98	46	92

Maternal blood transfusion	Group A	Group B
Given	1	4
Not given	49	46

Maternal Complication	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Vomiting	5	10	3	6
Fever	1	2	4	8

Hospital stay after 8^{th} POD	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Yes	0	0	2	4
No	50	100	48	96

NICU Admission	No of Cases in			
	Group-A		Group-B	
	No	%	No	%
Yes	1	2	2	4
No	49	98	48	96

S.No	Name Code	Age	IP.NO	AN Care	Parity	Subjective Characters			Pre Operative					Blood Loss(*ml*)			Post Op					Maternal blood transfusion	Maternal Complications	NICU Admission	Patient stayed for more than 8th POD
																	2 hrs PP			3rd POD					
						Weight (kgs)	Height (cms)	BMI	PR/min	BP mmHg	RR/min	Hb-Gm%	Type of Surgery	PD- EOS	EOS- 2hrs PP	PD - 2hrs PP	PR / min	BP mmHg	RR/min	Hb-Gm%				
1	A1	25	42130	UB	G2P1L1	53	154	22.3	82	110/70	18	8.8	EL	220	40	260	84	110/70	18	8.8	No	No	No	No
2	A2	24	78142	B	G2P1L1	61	164	22.7	84	112/70	18	9.6	EL	241	54	295	86	110/70	20	9.4	No	No	No	No
3	A3	30	78432	UB	G2P1L1	62	165	22.8	82	110/70	20	9.2	EM	240	40	280	84	110/70	20	9	No	No	No	No
4	A4	20	79872	UB	PRIMI	60	162	22.9	82	110/70	20	8.6	EL	254	42	296	82	110/70	20	8.6	No	No	No	No
5	A5	27	79845	UB	G2P1L1	61	164	22.7	84	112/70	18	8.8	EM	230	60	290	84	110/70	20	8.6	No	No	No	No
6	A6	21	79870	UB	PRIMI	56	158	22.4	84	110/70	18	9.2	EM	245	49	294	86	110/70	18	9	No	No	No	No
7	A7	20	80145	UB	G2P1L1	58	160	22.7	82	120/70	20	9.4	EL	230	60	290	84	120/70	20	9.2	No	No	No	No
8	A8	23	42231	UB	G2P1L1	61	162	23.2	84	122/80	18	9.4	EL	250	40	290	84	122/80	18	9.4	No	No	No	No
9	A9	24	77722	UB	G2P1L1	63	160	24.6	84	120/80	16	9.2	EL	220	41	261	86	120/80	16	9	No	No	No	No
10	A10	22	42139	UB	G2P1L1	62	158	24.8	82	110/70	18	8.8	EM	240	50	290	86	110/70	18	8.8	No	Vomiting	No	No
11	A11	28	80672	UB	G2P1L1	48	146	22.5	84	120/70	18	9.2	EL	220	50	270	86	120/70	20	9	No	No	No	No
12	A12	25	80662	B	G2P1L0	65	165	23.9	86	110/80	18	9.4	EL	240	50	290	88	110/80	18	9.4	No	No	No	No
13	A13	26	80751	B	G2P1L1	51	162	19.4	82	116/70	16	8.6	EL	243	50	293	84	110/70	18	8.6	No	No	No	No
14	A14	23	81729	UB	PRIMI	50	160	19.5	82	110/80	18	8.8	EL	220	40	260	86	110/80	18	8.6	No	No	No	No
15	A15	28	42307	B	G2P1L0	54	166	19.6	84	110/70	20	8.8	EM	230	43	273	84	110/70	20	8.8	No	Fever	No	No
16	A16	21	81230	UB	G2P1L1	48	148	21.9	86	120/80	20	8.6	EL	230	42	272	86	120/80	20	8.6	No	No	No	No
17	A17	28	81499	UB	G2P1L1	57	161	22	84	120/70	16	8.4	EM	440	67	507	84	120/70	16	8.4	Yes	Vomiting	No	No
18	A18	29	42316	B	G2P1L1	55	165	20.2	82	122/80	18	10.2	EL	260	40	300	86	120/80	20	10	No	No	No	No
19	A19	23	42347	UB	G2P1L1	48	150	21.3	82	110/70	20	8.8	EL	240	40	280	84	110/70	20	8.8	No	No	No	No
20	A20	23	42359	UB	PRIMI	45	148	20.5	82	126/76	18	9.2	EM	230	45	275	84	120/70	18	9	No	No	No	No
21	A21	25	42383	B	G2P1L1	52	164	19.3	84	120/70	20	9	EM	240	45	285	84	120/70	20	9	No	No	No	No
22	A22	22	82633	B	PRIMI	62	166	22.5	82	110/70	18	8.8	EL	242	43	285	85	110/70	18	8.8	No	No	No	No

23	A23	26	87580	B	G2P1L1	44	143	21.5	82	114/82	18	9.4	EL	245	44	289	86	110/80	18	9.2	No	No	No	No
24	A24	25	82245	UB	G2P1L1	49	142	24.3	84	120/80	20	8.6	EM	252	42	294	87	120/80	22	8.6	No	No	yes	No
25	A25	24	82513	B	G2P1L1	55	151	24.1	86	122/86	18	10.4	EL	250	40	290	89	122/86	18	10.2	No	No	No	No
26	A26	24	81471	UB	G2P1L1	53	148	24.2	80	116/86	20	8.8	EM	246	52	298	80	110/70	20	8.4	No	No	No	No
27	A27	27	83061	B	G2P1L1	55	150	24.4	82	110/70	16	9	EM	235	52	287	84	110/70	16	8.8	No	No	No	No
28	A28	28	84297	UB	G2P1L1	57	153	24.3	84	114/82	18	9	EL	244	46	290	86	114/82	20	9	No	No	No	No
29	A29	22	84307	UB	G2P1L1	52	153	22.2	80	110/70	20	9	EL	239	51	290	84	110/70	20	9	No	No	No	No
30	A30	22	83408	UB	PRIMI	61	164	22.7	82	120/70	20	9.6	EL	247	46	293	86	124/70	20	9.4	No	No	No	No
31	A31	29	42524	B	G2P1L1	58	160	22.7	84	122/80	18	9	EL	250	40	290	86	122/80	18	9	No	No	No	No
32	A31	21	42467	B	PRIMI	51	152	22.1	80	110/70	18	10.6	EM	243	49	292	82	110/70	18	10.4	No	No	No	No
33	A33	22	86536	UB	PRIMI	60	164	22.3	80	120/80	22	9	EL	251	43	294	84	110/70	22	9	No	Vomiting	No	No
34	A34	25	42476	B	G2P1L1	62	162	23.6	82	116/82	18	8.6	EL	245	51	296	84	110/80	18	8.6	No	No	No	No
35	A35	26	42486	UB	G2P1L1	58	165	21.3	84	110/80	20	9	EL	238	52	290	84	110/80	20	9	No	No	No	No
36	A36	26	84508	B	G2P1L1	61	172	20.6	82	110/70	18	10.2	EL	238	41	279	84	110/70	18	10	No	No	No	No
37	A37	26	87262	UB	G2P1L1	66	168	23.4	80	120/70	20	9.2	EM	246	42	288	82	120/70	20	9.2	No	No	No	No
38	A38	19	85591	UB	PRIMI	57	158	22.8	82	110/80	18	9.8	EL	248	52	300	84	110/80	18	9.8	No	Vomiting	No	No
39	A39	19	87047	UB	PRIMI	48	160	18.8	80	112/70	20	8.8	EL	251	47	298	82	114/70	20	8.8	No	No	No	No
40	A40	24	87001	UB	PRIMI	49	159	19.4	86	110/70	18	10	EM	252	45	297	88	110/70	18	9.8	No	No	No	No
41	A41	27	87009	B	G2P1L1	60	162	22.9	82	120/70	20	8.8	EL	245	56	301	82	120/70	20	8.8	No	No	No	No
42	A42	27	42556	B	G2P1L1	61	164	22.7	80	110/80	18	10	EL	252	40	292	80	110/80	18	10	No	No	No	No
43	A43	30	86506	UB	G2P1L1	56	158	22.4	84	114/86	20	8.6	EM	255	46	301	86	114/86	20	8.6	No	No	No	No
44	A44	35	84291	B	G2P1L1	58	160	22.7	82	110/70	18	8.6	EL	258	39	297	84	110/70	18	8.6	No	No	No	No
45	A45	23	42524	B	G2P1L1	61	162	23.2	80	110/70	18	8.6	EM	241	46	287	82	110/70	18	8.6	No	Vomiting	No	No
46	A46	28	87238	UB	G2P1L0	51	162	19.4	84	120/80	20	9.6	EL	252	39	291	84	120/80	20	9.6	No	No	No	No
47	A47	29	86735	UB	G2P1L1	50	160	19.5	82	110/80	18	8.8	EL	249	36	285	84	110/80	18	8.8	No	No	No	No
48	A48	23	42633	UB	PRIMI	54	166	19.6	80	120/76	18	8.4	EL	248	55	303	82	120/78	18	8.4	No	No	No	No
49	A49	23	42475	B	G2P1L1	48	148	21.9	82	110/70	20	8.6	EL	251	41	292	84	110/70	20	8.6	No	No	No	No

50	A50	23	42614	B	G2P1L1	57	161	22	80	120/80	18	9	EM	252	46	298	82	120/80	18	9	No	No	No	No
51	B1	23	42060	UB	PRIMI	55	163	20.7	82	110/70	18	8.8	EL	355	96	451	88	110/70	18	8.4	No	No	No	No
52	B2	29	79376	B	G2P1L1	48	150	21.3	82	122/80	16	9	EL	349	80	429	90	110/70	16	8.6	No	No	No	No
53	B3	27	79015	UB	PRIMI	45	153	19.2	86	116/72	18	10.6	EM	335	76	411	92	110/70	18	9.8	No	No	No	No
54	B4	25	79662	UB	PRIMI	52	162	19.8	80	120/80	16	9	EL	343	78	421	88	110/70	16	8.4	No	No	No	No
55	B5	30	79092	B	PRIMI	62	161	23.9	82	120/80	18	9.2	EL	351	78	429	90	110/70	18	8.8	No	No	No	No
56	B6	21	78309	UB	PRIMI	44	148	20.1	80	120/86	20	9.8	EL	349	79	428	88	120/80	20	9	No	No	No	No
57	B7	20	79416	UB	PRIMI	49	160	19.1	84	120/80	16	8.6	EM	452	86	538	82	110/70	18	8	Yes	Vomiting	No	No
58	B8	23	80639	UB	G2P1L1	55	155	22.9	80	118/82	18	9	EM	341	71	412	86	110/80	18	8.6	No	No	No	No
59	B9	24	81166	UB	G2P1L1	53	157	21.5	82	120/80	16	8.8	EL	353	72	425	88	110/70	16	8.4	No	No	No	No
60	B10	26	42317	B	G2P1L1	55	161	21.2	80	122/78	16	9.2	EL	349	82	431	88	120/70	16	8.8	No	No	No	No
61	B11	27	42338	UB	G2P1L1	57	158	22.8	82	120/80	16	9.6	EL	330	78	408	88	110/70	16	9	No	No	No	No
62	B12	25	81981	UB	PRIMI	52	157	21.1	80	126/82	18	9.6	EL	328	92	420	88	124/80	18	9	No	No	No	No
63	B13	24	81219	UB	G2P1L1	61	162	23.2	86	120/70	18	9.2	EL	342	86	428	92	110/70	18	8.8	No	No	No	No
64	B14	19	82411	UB	PRIMI	58	160	22.7	84	120/80	16	9	EM	458	92	550	92	110/70	20	8.4	Yes	Vomiting	No	yes
65	B15	24	82619	B	G2P1L1	57	159	22.5	82	120/70	18	9.2	EL	340	70	410	86	118/70	18	9	No	No	No	No
66	B16	29	82394	UB	G2P1L1	60	161	23.1	80	120/80	20	8.8	EM	342	76	418	88	110/70	20	8.4	No	Fever	No	No
67	B17	20	77732	UB	G2P1L1	62	162	23.6	82	110/86	18	9.2	EL	353	81	434	88	110/80	18	8.8	No	No	No	No
68	B18	25	42298	UB	G2P1L1	58	162	22.1	80	110/80	20	8.8	EL	456	96	552	90	110/70	20	8.4	Yes	No	No	No
69	B19	27	82417	B	G2P1L1	61	165	22.4	82	120/80	18	9.8	EL	345	74	419	88	120/80	18	9.4	No	No	No	No
70	B20	27	42328	B	G2P1L0	66	164	24.5	84	126/84	20	10	EM	353	73	426	88	120/80	20	9	No	No	yes	No
71	B21	29	82491	UB	PRIMI	57	158	22.8	82	120/80	20	8.8	EL	340	70	410	86	120/80	20	8.6	No	No	No	No
72	B22	20	82897	B	G2P1L1	60	163	22.6	80	110/80	22	9.2	EL	351	78	429	88	110/70	22	8.8	No	No	No	No
73	B23	18	83007	UB	PRIMI	55	157	22.3	80	110/70	20	9.2	EL	356	82	438	88	110/70	20	8.8	No	No	No	No
74	B24	24	83001	UB	G2P1L1	60	158	24	82	114/78	20	10	EM	362	70	432	88	110/70	20	9	No	No	No	No
75	B25	25	82891	B	G2P1L0	54	159	21.4	88	110/70	22	10	EL	345	74	419	92	110/70	22	9.2	No	No	No	No
76	B26	20	83230	UB	PRIMI	56	158	22.4	86	120/80	20	8.6	EM	440	92	532	96	110/70	20	8	Yes	Vomiting	No	yes

77	B27	28	42286	UB	G2P1L1	64	166	23.2	84	116/78	20	10	EL	361	76	437	90	110/70	20	9.2	No	No	No	No
78	B28	27	42333	B	G2P1L1	58	160	22.7	80	120/80	18	9.6	EL	341	78	419	88	110/80	18	9	No	No	No	No
79	B29	27	42206	UB	G2P1L1	60	158	24	86	120/78	18	9.8	EL	352	86	438	92	120/70	18	9	No	No	No	No
80	B30	26	83236	UB	G2P1L1	54	153	23.1	84	120/80	22	8.6	EL	359	88	447	92	110/70	22	8	No	No	No	No
81	B31	22	81815	B	PRIMI	62	158	24.8	80	110/80	18	9.6	EM	347	81	428	86	110/80	18	9.2	No	Fever	yes	No
82	B31	26	84275	UB	G2P1L1	58	161	22.4	82	110/80	20	9.2	EL	338	78	416	80	110/80	20	8.8	No	No	No	No
83	B33	20	84204	UB	G2P1L1	60	162	22.9	80	110/80	18	9.4	EL	345	75	420	82	110/70	18	9	No	No	No	No
84	B34	23	84131	UB	G2A1	57	165	20.9	84	122/86	16	9.8	EL	356	86	442	88	120/80	16	9	No	No	No	No
85	B35	22	83996	B	PRIMI	56	151	24.6	82	120/80	18	9.6	EL	330	88	418	86	120/80	18	9	No	No	No	No
86	B36	23	84056	UB	PRIMI	52	154	21.9	80	120/70	16	9	EL	360	76	436	90	110/70	16	8	No	No	No	No
87	B37	21	83292	B	PRIMI	56	157	22.7	82	120/80	18	9.2	EL	353	74	427	86	120/80	18	8.8	No	No	No	No
88	B38	21	83080	B	G2P1L1	61	160	23.8	82	110/80	20	9.8	EM	341	81	422	88	110/80	20	9	No	Fever	No	No
89	B39	23	83411	UB	G2P1L1	62	160	24.2	84	120/70	18	8.8	EL	340	72	412	70	120/70	18	8.6	No	No	No	No
90	B40	23	83482	B	G2P1L1	57	163	21.5	82	120/80	16	9	EL	341	79	420	86	120/80	16	8.6	No	No	No	No
91	B41	35	83456	B	G2P1L1	50	150	22.2	82	110/80	18	9	EL	351	72	423	84	110/70	18	8.6	No	No	No	No
92	B42	21	84243	B	PRIMI	54	154	22.8	86	110/86	20	8.8	EL	339	70	409	90	110/86	20	8.8	No	No	No	No
93	B43	21	83644	UB	PRIMI	55	154	23.2	82	110/70	18	10	EM	351	85	436	88	110/70	18	9.6	No	Fever	No	No
94	B44	27	83733	B	G2P1L1	54	152	23.4	80	110/80	20	9.2	EL	344	85	429	88	110/80	20	9	No	No	No	No
95	B45	29	84944	B	G2P1L1	50	150	22.2	78	110/70	18	9	EL	351	69	420	86	110/70	18	8.6	No	No	No	No
96	B46	22	85058	B	G2P1L0	56	154	23.6	82	110/80	20	9.4	EL	343	73	416	80	110/80	20	9.2	No	No	No	No
97	B47	28	84745	B	G2A1	57	161	22	80	122/76	18	8.8	EL	336	72	408	76	122/76	18	8.8	No	No	No	No
98	B48	33	85099	UB	G2A1	56	158	22.4	86	110/80	16	8.8	EL	340	72	412	88	110/80	16	8.6	No	No	No	No
99	B49	24	85185	B	G2P1L1	48	154	20.2	82	120/82	18	8.6	EL	352	81	433	86	120/82	18	8.6	No	No	No	No
100	B50	23	84867	B	G2P1L1	52	154	21.9	82	110/80	20	9.6	EL	351	71	422	86	110/70	20	9	No	No	No	No